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REPORT

OF THE

BOARD OF EDUCATION

OF

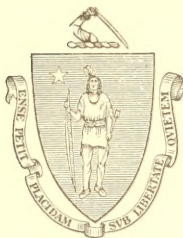
MASSACHUSETTS

ON

AGRICULTURAL EDUCATION.

SUBMITTED TO THE LEGISLATURE OF MASSACHUSETTS IN
ACCORDANCE WITH RESOLVES APPROVED
MAY 28 AND JUNE 10, 1910.

JANUARY, 1911.



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The Commonwealth of Massachusetts.

REPORT ON AGRICULTURAL EDUCATION.

To the Honorable the Senate and House of Representatives.

In accordance with the provisions of chapters 108 and 133, Resolves of 1910, concerning the advisability of establishing a system of agricultural schools throughout the Commonwealth, and concerning the practicability and desirability of establishing a farm school in the city of Worcester, the Board of Education herewith reports the results of investigations and recommendations, made under its direction by the Commissioner of Education, David Snedden, Deputy Commissioner Charles A. Prosser and Special Agent Rufus W. Stimson.

The Board adopts the report and endorses the recommendations.

FREDERICK P. FISH, *Chairman*,
SARAH LOUISE ARNOLD,
ELLA LYMAN CABOT,
SIMEON B. CHASE,
LEVI L. CONANT,
THOMAS B. FITZPATRICK,
FREDERICK W. HAMILTON,
PAUL H. HANUS,
CLINTON Q. RICHMOND,

Members of the Board.

JAN. 1, 1911.

I.

PRELIMINARY STATEMENTS, SUMMARY OF THE REPORT AND RECOMMENDATIONS.

Following is the text of the resolves passed by the Legislature:—

RESOLVES OF 1910, CHAPTER 108.

Resolved, That the state board of education shall investigate the practicability and desirability of establishing a farm school in the city of Worcester in which instruction may be given, free, in the raising of fruits, vegetables, flowers, grains, plants and trees, and in the care of domestic animals, and in which similar instruction suitable to their years may be given to children. The board shall report in print to the general court, with such recommendations as it may deem proper, not later than January fifth, nineteen hundred and eleven. [*Approved May 28, 1910.*]

RESOLVES OF 1910, CHAPTER 133.

Resolved, That the board of education is hereby authorized and directed to investigate the advisability of establishing a system of agricultural schools throughout the commonwealth, and to report the result of its investigation with its recommendations to the next general court not later than the second Wednesday in January, nineteen hundred and eleven. [*Approved June 10, 1910.*]

In obedience to these resolves, the Board of Education directed the Commissioner of Education to make the necessary investigations and to engage expert assistance. Mr. Rufus W. Stimson, director of Smith's Agricultural School and Northampton School of Industries, was appointed to assist in making the investigations and preparing the report.

Special acknowledgment is here made of the assistance of the following: President Kenyon L. Butterfield and members of the faculty of Massachusetts Agricultural College; Secretary J. Lewis Ellsworth of the State Board of Agriculture; Mr. Dick J. Crosby, specialist, and Mr. F. W. Howe, assistant specialist, in agricultural education, of the United States Department of Agriculture, Office of Experiment Stations; Mr.

Arthur C. Monahan, agricultural specialist of the United States Bureau of Education; the Hon. C. D. Richardson, Past Master, and the Hon. Charles M. Gardner, Master, of the Massachusetts State Grange; and many other citizens of Massachusetts.

A brief survey has been made of the development of agricultural education in Massachusetts and like work elsewhere. The economic status and prospects of farming, as conducted by both men and women, in this State, have been examined.

Selected and typical centers have been studied, as to the facilities for transportation, as to the most promising lines of farming in practice, and as to the probable enrollment in an agricultural school or department. All parts of the State have thus received attention, with the exception of the islands of Dukes and Nantucket. It will be easily understood that this report can deal only in general terms with the results of these local investigations.

Printed sources of information have been used, and conferences have been held both with groups and with individuals. By far the largest number of consultations have been held on their own premises with farmers who are obtaining their living from their agricultural work, and who are regarded by their communities as sound in judgment, methods and ideas.

No serious appraisalment of educational needs and values has been undertaken, beyond the strict limits of agricultural training adapted to youths from fourteen years of age upward. In fact, attention has been almost exclusively confined to agricultural education suitable for boys, and perhaps for some girls, who intend to follow farming for a livelihood, and who, but for the type of training recommended in this report, probably would follow the practice of a long line of their predecessors, and drop out of school altogether.

Provision of agricultural education for girls who have passed their fourteenth birthday has been considered. This problem raises very important questions, both educational and economic. There is little experience, so far, by which to be guided. It is believed, therefore, that this subject should be further investigated, and that the questions involved can best be answered by actual experiments made in connection with the agricultural schools and departments proposed in this report.

FINDINGS IN BRIEF.

The agricultural and educational conditions in this Commonwealth are believed to warrant the following conclusions: —

1. Farming in Massachusetts is a highly important vocation.

2. Massachusetts farming, where most profitably practiced, is peculiarly dependent upon, and responsive to, scientific knowledge and improved methods. Its increasing diversity and specialization, which are such promising elements in its progress, make more difficult the task of preparation for it, and make more emphatic the duty of the State to the boys and girls who are to follow it.

3. Agencies for carrying scientific knowledge and improved methods to adults, and to students of such age and preliminary training as to enable them to meet the usual college entrance requirements, appear to have been both carefully considered and fairly well established.

4. There is a decided lack of, and a pronounced demand for, agricultural training of a scientific and very practical character, suitable for boys, and perhaps for some girls, fourteen years of age and older, who expect to gain their livelihood from, and to spend their lives on, Massachusetts farms.

5. The growing commercial and industrial school facilities open to boys and girls fourteen years of age and older, tend to lure away from the land and into the congested centers, in the absence of competent and attractive agricultural education, many young people whose natural aptitudes would make them, if properly trained, better and more prosperous citizens in the country.

6. Financial aid for agricultural education, suitable for adults and for college students, has for a half-century been furnished by this Commonwealth and by the federal government. State aid for vocational training of secondary grade in agriculture, is, moreover, entirely in keeping with State aid for independent industrial school work, and to some extent was provided for by chapter 505 of the Acts of 1906 and chapter 572 of the Acts of 1908.

7. The slow development of secondary agricultural schools, the testimony of farmers throughout the State, and the demand

for the investigation here reported which was made by the Legislature of 1910, are evidence of the need of additional legislation providing for this kind of agricultural education.

8. School committees have long been authorized and empowered to provide instruction in agriculture in the public elementary and high schools of the State. While this training has been more liberal and cultural than vocational in its aims and results, it merits the hearty support of local communities in this Commonwealth.

Instruction in gardening and in other matters relating to the farm should be encouraged and guided in all the elementary schools of the State, where the home environment or the school facilities make productive work and personal observation by the pupils practicable.

As an important aid to liberal education in all of the high schools of the State, particularly in those which have a rural environment, guidance and encouragement should be given, with a view to the incorporation of generous proportions of agricultural subject matter in the science instruction, and to the sympathetic correlation of certain parts of the instruction in English, history, civics and hygiene with rural life and labor, institutions and progress.

9. In order that more adequate school facilities may be provided in this Commonwealth for preparing those above fourteen years of age for productive and profitable farming, vocational agricultural departments are proposed in this report for establishment in existing high schools.

The methods and vocational standards of instruction for the development of such agricultural departments have nowhere been tried in the exact form proposed in this report. Such approximations to this kind of training as have been found in this State and elsewhere, and the very general interest in and approval of it found among representative Massachusetts farmers with whom it has been discussed, are believed to warrant giving the department type a thorough trial.

The experimental character of the department type, it will be noticed, has been recognized in the proposed codification of the law. It is designed that the problems which would confront such departments shall be carefully studied, that their work shall be thoroughly done, and that no department shall

be attempted where conditions for success are not reasonably favorable.

While annual State aid to the amount of \$10,000 might make ten departments possible, it is by no means certain that it would be found advisable to establish ten departments, or even five, the first year. On the other hand, if the proposed department type of agricultural training should prove in actual use to embody the merit which it is believed to possess, provision for increasing the number beyond ten could in future be made.

RECOMMENDATIONS.

In view, then, of the needs of the State as we have found them, the following three recommendations are respectfully submitted:—

1. We recommend that State aid, equal to that granted any town, or group of towns constituting a district, for industrial schools, be continued as at present provided for in the case of any town, or group of towns constituting a district, for the establishment and maintenance of an independent agricultural school. (See chapter 505, Acts of 1906, and chapter 572, Acts of 1908.)

2. We recommend that provision be made for the establishment of agricultural departments in existing high schools, with State aid, and with rigid definition and enforcement of vocational standards.

3. We recommend that the above provisions shall be considered to be sufficient for meeting the needs of Worcester, in common with those of all other parts of the Commonwealth, and, therefore, to obviate all necessity for special legislation on behalf of that city.

The above recommendations are, of course, to be interpreted in the light of this entire report.

PROPOSED LEGISLATION.

The Board is submitting to the General Court a proposed codification of legislation relating to industrial, agricultural and household arts education. In that codification is included what is believed to be ample legal provision for the establishment of a system of agricultural schools.

For convenient reference, a copy of the proposed codification is bound herewith as an Appendix.

II.

DOES MASSACHUSETTS FARMING WARRANT
THE ESTABLISHMENT OF A SYSTEM OF
AGRICULTURAL SCHOOLS?

Does farming in Massachusetts offer sufficiently important and attractive careers to warrant the establishment of a system of agricultural schools in this Commonwealth, to train boys and girls who have reached their fourteenth birthday for farm life and work? The present chapter briefly reviews farming incentives and prospects as they are found in this State to-day.

1. *Incentives to Farming in Massachusetts are Many.* — In a given farming enterprise there may be blended any two or three, or there may be blended all, of the incentives which make farming in this State attractive.

(1) *The stress and uncertainties of other callings* lead many to engage in farming. Severe competition and uncertainty as to the future in business have resulted in the purchase and development of Massachusetts farm land. Prospects for a profitable investment, a stable occupation and a lifelong employment at congenial work are incentives to redirection of effort in such a case.

A section of this State was pointed out, during the investigation leading to this report, which was said to have been bought up, one small holding after another, by "broken-down mechanics." It might be fairly considered one of the least promising sections for farming. The operations undertaken were on a small scale; in no instance on a large one. Health and vigor, and self-sustaining life for their children and themselves, free from the severe competition in the trades and industries, were the primary incentives in these cases.

Farming in Massachusetts has become increasingly attractive to immigrants who have left the old world and come here with the determination to succeed. These immigrants are not so much peasants as they are pioneers. They are thrifty and observant; they are quick to adopt new ideas and methods.

Money is saved and invested. Theirs is a program of hope. As their savings and their holdings increase in value, their standards of living rise; they begin to educate their children, and presently are on a level with other good citizens in their communities.

(2) *The attractions and associations* in the family are strong motives with many. Farm after farm is owned and operated now by the same family, in whose ancestral line it has remained for eight or even nine generations.

(3) *The natural charm of the country* may be said to be the motive for the establishment of the growing number of more or less magnificent estates in Massachusetts. The North Shore, the South Shore and the Berkshires are noted for the men from the great cities and even from distant States who have sought Massachusetts land for its picturesque actualities and possibilities.

Most of these estates possess well-rounded agricultural equipment, and have created a large demand for skilled gardeners, florists, fruit growers, herdsman, grooms and trainers. They employ expert farm managers, and supply their own tables with the cleanest milk and the choicest farm, garden, orchard and greenhouse products. The stables of at least one of these estates shelter harness horse championship winners in international competitions. The owners pay the highest prices for the best-bred live stock, and in notable instances have put their farming operations on a strictly economic basis, as object lessons for neighboring farmers.

Beside and among these more splendid estates there is a multitude of simpler establishments, maintained on a more modest scale, for like purposes.

Sometimes one hears the protest that such estates are, as a whole, detrimental to the public good. Whatever may or may not be the merits of this contention from the point of view of the community at large, it is certain that their establishment cannot at present be regarded as detrimental to the interests of those who must be dependent upon farming for a livelihood.

(4) *A life pursuit to be found in farming* is the compelling incentive of many people who engage in agriculture. This State has its misfits and failures on farms, as in every other

line of human activity; but it also has farmers who love, and are finding profitable, the careers on the land which they have chosen. The success of the latter is undoubtedly due to two causes: (*a*) to a fundamental liking for the land and all the natural accompaniments of its cultivation; and (*b*) to the economic status and prospects of farming in this Commonwealth, discussed in the following section. The investigations on which this report is based yielded abundant and convincing evidence that Massachusetts farmers believe, not only that farming in general offers a desirable career, but also that those who intend to make farming a life pursuit in this State will find themselves put to no serious disadvantage because their lot is to be cast in this Commonwealth.

2. *Farming prospects are good*, and are steadily improving. Having glanced over some of the incentives which have led men to engage in farming operations, we may now consider certain facts and figures with regard to the condition of agriculture in this State.

(1) *The agricultural census of Massachusetts* shows that farming prospects are good. The Massachusetts State census for 1905 reported the value of property devoted to agriculture in general in this State as \$288,153,000. The annual farming output was valued at \$73,110,000. The growth of agriculture in importance is shown by the fact that in 1875 the total value of output was \$37,073,000; in 1885, \$47,756,000; in 1895, \$52,880,000; and in 1905, \$73,110,000.

In 1905 the value of the agricultural products of Worcester County was reported as \$14,279,000; and of the city of Worcester alone as \$1,491,000.

There is no reason for believing that State census figures for 1910 would show retrogression. In three decades, ended in 1905, the annual value of agricultural products in this State had practically doubled. The United States census may not show large additions to the agricultural population of this Commonwealth, but it may reasonably be expected to show gains, at least commensurate with those of the last generation, in the annual value of Massachusetts agricultural products.

(2) *Massachusetts farmers say* farming prospects are promising. Most of the conferences held in preparation for this report

were personal interviews with Massachusetts farmers on their own premises, — farmers who are regarded by their communities as thoroughly reliable, and who are dependent on their farming for a living. In all sections of the State the prevailing opinion is that no State offers a better opportunity for profitable agriculture and a satisfactory home life on the farm than does Massachusetts. This was shown by statements such as the following: —

“We have good land.” “We have the best markets in the world.” “We have good roads and short hauls.” “We have excellent shipping facilities, and the cost of shipment is light when compared with the cost of shipping produce from distant points.” “We can generally get enough good help.” “I increase my market garden production a little every year; the more I produce, the more I can sell.”

“The cities are growing so much faster than the rate of increase of production from the land, that excessive competition is not to be feared, and prices for prime farm products are bound to continue good and are likely to become better.” “The great variety of soils and products is favorable to satisfactory farming, taking one year with another, in this State.” “A keen eye to the markets, and shipment to New York or other out-of-the-State points, when prices rule low here and high there, take care of any temporary surplus or slump in home market prices.” “For choice fruit there are almost unbelievable possibilities in the home market, with the port of Boston ready for shipment of practically unlimited quantities, especially of apples, to foreign markets.”

“We have good libraries, public schools and churches.” “The Grange in Massachusetts is a splendid organization for getting the farmers together for pleasure and the improvement of their life and work.”

Such are the things said by the farmers themselves of the advantages of farming in this State.

(3) *The small number of abandoned farms* shows farming prospects to be improving. Secretary Ellsworth of the State Board of Agriculture now has in press a report of 160 pages, entitled “Massachusetts, her Agricultural Resources, Advantages and Opportunities, with a List of Farms for Sale.” The publication of this report at just this moment is singularly opportune, and makes unnecessary any extended treatment in this chapter of the subject now touched upon.

In his preface Secretary Ellsworth says that his publication

is issued at the beginning of an exceptional era in Massachusetts agriculture. . . . While an effort was made to secure the names of parties owning or controlling strictly abandoned farms, the attempt was ineffectual, and we are forced to confess that in our belief there are few such farms in the State. Nevertheless, reports confirm the opinion that there is an enormous amount of land lying idle or partly deserted, and that many farms are not worked to anywhere near their limit.

(4) *Improved tillage* makes farming prospects better. Massachusetts land is remarkably responsive to better farming. Land once tilled but now lying for the moment largely or even entirely neglected may well be regarded as a sign post of dormant fertility. Such land is simply resting. Striking examples of this fact came to view during the investigation the past summer. One instance may suffice for the present purpose, and the fact that this is furnished by the work of a woman whose farm was visited renders it none the less significant.

The owner of an intensively tilled farm, with a model dairy and well-developed piggery, poultry, market-garden and greenhouse departments, desired to increase her output. She therefore bought a 20-acre field. This lay next adjoining her own improved land, but had not been cropped within the memory of the oldest inhabitant of that section,—not for at least sixty years, and probably not for more than a century. It was sparsely strewn with wild grass, gray moss, sweet fern and bayberry. The former owner had often said that he would keep a yoke of oxen if he only thought he could grow enough feed for them, but he did not believe he could do it.

The past summer, its first season in tillage at the hands of its present owner, this field yielded 10 acres of rye, straw and grain; 250 bushels of splendid potatoes; 80 tons of ensilage, now in the silo; 2 acres of heavy field corn, at the time of the interview standing in the shocks; and 2 tons of sugar pumpkins; while at the time the field was visited there were 8 acres in clover, sown in the rye and showing a good “catch,” ½-acre in turnips, with the remainder of the field laid down to rye again.

(5) *Increase of investments* in land shows that farming is becoming more attractive as a business enterprise. Keen business sagacity has led a caterer well known in this State to

purchase a farm and develop it as an adjunct to his city business. His farm is a strictly financial proposition. Though model equipment and conditions have been established, he does not use it for a summer residence, and his visits to the farm are for inspection and for conference with his manager. Strict accounts are kept. Waste from the catering kitchens is sold to the piggery department. Poultry, market-garden, piggery, fruit and dairy products are sold to the catering ends of the combined business. The books show that the farm is a paying investment.

"Golden New England," by Mr. Sylvester Baxter ("The Outlook," Sept. 24, 1910, pages 179-190), is an account of the status and prospects of farming in this section. Mr. Baxter gives the following instance:—

On a certain Essex County place a Boston business man has gone into apples in a way that ranks the undertaking as a great business enterprise. A single place, with something like 50,000 apple trees, not only cuts a large figure in Massachusetts,—even in the great west it would mean "going some."

(6) *With little farms*, intensive farming yields large returns. Contrasted with the western prairies, the smaller fields along and among the hills and streams of Massachusetts have seemed to some impossible of profitable cultivation. By them it is even asserted that Massachusetts is "not an agricultural State." Such a remark is met by the Massachusetts farmer with a blank look of amazement. He has no doubt that farming in this State is a permanent and an increasingly important vocation. He knows that fundamental to advancing agriculture is a market commensurate with its output; and he sees the manufacturing towns in his neighborhood growing with a rapidity almost beyond belief.

Even in the west, not the enormous holding, but the smaller one is now recognized as the more promising basis for the most permanent and profitable agricultural production. Evidence is abundant that the little farm may yield large returns. One of the tidiest bits of farming seen the past summer was on a 10-acre farm, of which part was in pasture and only about 6 acres were under cultivation. Some of the land was tilted on

edge, in typical New England fashion. All of the fields were more or less irregular in their boundaries, and from some of them cartloads of stones had been removed, with more to follow. The land was "kept busy." Market gardening was the main feature, but there was fruit; and there were "side lines" of dairying and poultry, for utilizing "clippings" and unsalable remnants of the principal products. This farm is yielding a profit of \$5,000 a year.

Other farms visited, which to the unaccustomed eye might look small, are yielding net returns of from \$2,000 to \$10,000, and even \$12,000, a year. Greater thrift and satisfaction in work well done one could not hope to find in any State.

Mr. Baxter, in the article above cited, gives the following instances:—

A half-acre strawberry patch, . . . yields 5,000 quarts, worth \$625. Eleven hundred dollars have come from an acre and a half of cantaloupes. There are thousands of acres in asparagus in Massachusetts alone, with profits of \$300 or even \$600 an acre. An Italian makes from \$4,000 to \$5,000 a year off of 4 acres in market gardening. Five acres in peaches have yielded \$2,500 in one year. Apples! That is a story in itself. And flowers? Well, there is a lady on Cape Cod who makes \$200 or so every summer on a patch of sweet peas little bigger than a city back yard. As for potatoes and corn, there are numerous big records.

(7) *Comparison of productivity* with other States shows farming prospects to be good. Secretary Ellsworth, in the pamphlet before mentioned, is outspoken and explicit in his estimate of the agricultural prospects of Massachusetts. This has previously been intimated, and will more clearly appear from the following passage:—

. . . when ratio of aggregate production to aggregate acreage, yield per acre of certain crops and character of tillage are considered, Massachusetts ranks favorably with the leading agricultural States. The following data, gleaned from the latest official statistics, add strength to this statement:—

In 1900 Massachusetts had 3,147,064 acres in farms, which yielded the previous year \$42,298,274 worth of farm products. As compared with the five leading agricultural States, we find California, with nine times this number of acres in farms, producing only three times as

many dollars' worth of farm products; Illinois, with ten times the farm acreage, producing eight times as many dollars' worth of farm products; Iowa, with eleven times the farm acreage, producing nine times as many dollars' worth of farm products; Kansas, with thirteen times the farm acreage, producing four and one-half times as many dollars' worth of farm products; and Texas, with forty times the farm acreage, producing five times as many dollars' worth of farm products.

Further, from the estimates of the United States Department of Agriculture for 1908 these striking figures are obtained: the average production per acre of Indian corn for the United States was 26.2 bushels; for Massachusetts, 40.4 bushels; of oats for the United States, 25 bushels; for Massachusetts, 33 bushels; of potatoes for the United States, 85.7 bushels; for Massachusetts, 95 bushels. In relative rank of production per acre, Massachusetts stands among the States, for corn fourth, for oats thirteenth, for potatoes twelfth. When compared with the leading States in these products, Massachusetts ranks in production per acre, for corn fourth, for oats first and for potatoes second.

The crops used for comparison are not the leading agricultural products of Massachusetts, but the figures indicate what the intensive methods of agriculture practiced by her farmers is bringing forth from the soil. While comparative figures for other States of those products which are most valuable to Massachusetts are not available, it is safe to assert, without fear of contradiction, that, whereas the production per acre of such field crops as corn, oats and potatoes is relatively high, the production per acre of fruits and other vegetables which respond so much more readily to intensive treatment is not exceeded by that of any other State of the same or higher latitude.

3. *Conclusions.* — It is believed, in short, that the experience of those who are successfully engaged in farming here, and the economic status and prospects of farming in this Commonwealth, show conclusively that exceptional success awaits the work of the exceptional man or woman in this field of economic activity; and that farming is bound to afford a profitable and satisfactory living for the average boy or girl who enters this field with a thrifty, alert and progressive spirit, and with a proper preliminary education.

At the beginning of the investigation leading to this report, the question was raised as to whether a system of agricultural schools would be likely to result in increased valuation of taxable property on farms, and thus return directly to the public treasury at least some portion of its cost. One farmer put the gist of the answers of all his fellows into the succinct reply,

that it did not take the assessors long to discover any improvements that he made on his farm as a result of better methods.

Finally, it appears that farming in Massachusetts, viewed from the standpoint of both its present status and its prospects, is a calling the successful pursuit of which requires a knowledge of the science that lies back of the practice of agriculture as a handicraft; that, in order to secure a widespread productive and profitable agriculture, it is necessary that vocational schools supported and controlled by the public should train the youth in the best methods of farming; and that farming in Massachusetts is a calling of sufficient importance to justify both local and State support of those forms of education that will effectively prepare boys, and, to some extent at least, girls, for it.

III.

THE SYSTEM OF AGRICULTURAL SCHOOLS RECOMMENDED FOR MASSACHUSETTS.

It was pointed out in the previous chapter that the condition and prospects of farming in Massachusetts seem to justify a system of agricultural schools. The question arises as to what types of schools are desirable for this Commonwealth. Two promise to be effective. These are the separate or independent agricultural school, and the agricultural department in the public high school.

1. SEPARATE AGRICULTURAL SCHOOL.

(1) *Definition and Examples.* — The separate agricultural school aims to promote, by education, economic farming. Its location, plant, staff and courses of training are determined by this object. Such a school may, or may not, be on the same site with an institution of different grade or type. Whatever its proximity to other kinds of institutions, it requires a distinctly agricultural atmosphere and a farming environment.

Instances of this type are: Minnesota Agricultural School, St. Anthony Park; the secondary agricultural courses at Guelph, Ont., and Storrs, Conn.; and Smith's Agricultural School, Northampton, Mass.

(2) *Minimum Standards.* — Present experience seems to show that schools designed to give vocational education must meet certain minimum requirements in order to do effective work. The following may be given as examples of such requirements for the separate agricultural schools: —

A. Location and Plant. — *a. Accessibility.* — The economic operation of a separate agricultural school and its usefulness to the State depend upon a considerable enrollment of students. Experience demonstrates that an attendance of less than 100 means either an excessive per capita cost or inferior teaching. The spot selected for it, therefore, should be easily reached from a considerable farming area.

b. Acreage and Variety of Soil. — The land should be typical of the surrounding region, and permit of demonstration of the best methods of farming for that section of the State. If not a special school, devoted, for example, to market gardening, it should have a sufficient acreage and variety of land for landscape gardening, forestry and general farm tillage, as well as for gardening and nursery plots.

c. Buildings. — The buildings should be especially designed and grouped for the peculiar work of the school. Such buildings as barns and poultry houses should be of the kind any farmer with a moderate amount of capital would wish to erect as parts of a convenient, sanitary and practical plant.

d. Live Stock. — Quarters for all kinds of live stock suited to the locality should be provided. The school might, or might not, own the live stock dealt with in class demonstrations. The best obtainable specimens of the breeds studied should be seen and handled, and proper accommodations for keeping them should make it easy to borrow or hire the animals when needed. When not filled with live stock, these quarters would still be on view as models of their several kinds for housing and caring for the various types of farm animals.

e. Other Equipment. — The equipment should be modern and varied, but every piece should be applicable to some project in practical farming. Submitted to the test of practical farming, much, for example, of the equipment usually found in high school science laboratories would be omitted and other equipment would be selected. A museum for collecting out-of-date farm implements and machines would serve a most excellent informational purpose; but the main object should be to provide the best models of implements and machines for present economic use.

B. Support and Control. — The cost of such schools is large, generally too large to be provided by a single community. In good schools the initial cost of the plant, including adequate land, buildings and equipment, and of providing for from 100 to 150 students, has been from \$40,000 upward. The annual maintenance cost has varied from \$8,000 upward. In some cases the cost has been less than, in others it has considerably exceeded, the figures here named for both plant and maintenance.

a. Local Support. — The school should be established and equipped by the local community, — by a town or city, or by a group of towns or cities, or towns and cities formed into a district. This should insure economy of construction and adaptation to local needs. The local community should provide, also, one-half the cost of maintenance.

b. State Support. — One-half the maintenance cost of these schools should, in accordance with present statutory provisions, be borne by the State. In consideration of State support, the school should be subject to supervision and approval by the Board of Education as to organization, control, location, equipment, courses of study, qualifications of teachers, methods of instruction, conditions of admission and employment of pupils and expenditures of money.

C. Conditions of Admission and Promotion. — All applicants for admission above fourteen years of age should be received, provided, after a brief probationary period, they proved able to profit by the instruction.

Advancement from subject to subject or from class to class in farming subjects should be dependent solely upon the proficiency of the pupil in such subjects, and not upon his standing in English, history or other similar studies. Upon withdrawal from the school, whether upon graduation or earlier in the course, every student should be given a certificate containing a statement of the work which he had satisfactorily completed.

D. Teaching Staff. — *a. Vocational Spirit.* — The teaching staff must be in complete sympathy with the vocational purpose the school is designed to serve. The instructors should be chosen from those who have found, or who intend to find, their life work in this field of education.

b. Fitness. — Aptitude for teaching fourteen to eighteen year old boys of exceedingly practical interests and tendencies is indispensable. One may succeed as a teacher of men, and fail as a teacher of boys. One may succeed in a cultural school with book subjects, yet utterly fail in teaching practical subjects in a vocational school. To natural aptitude must also be added special training in the science and in the practice of different kinds of farming.

c. Originality and Resourcefulness. — In devising and lead-

ing the students to work out definite farming activities, the teachers must be able to bring to bear in new and largely untried ways knowledge of the general field of agricultural science and practice. Having selected things to be done, it must rest with the teaching staff to find help for doing these things, — in related portions of mathematics, chemistry, physical science, biology and economics.

d. Co-operation. — One teacher must help another. Unity of effort is no less important than is unity of spirit. All eyes must first be fixed on the things to be done; then, towards doing those things in the most intelligent and skillful manner, each member of the staff should contribute his particular part.

E. Course of Preparation for General Farming. — Courses should be provided for boys and girls. The girls should be trained in all household arts and affairs. They should also be allowed, if not required, to take training in such subjects as gardening, poultry raising, bee-keeping and ornamental planting. Here, however, only the agricultural course as designed for the boys is discussed.

a. Length of Course. — A four-years course for boys entering at fourteen should be provided. Each year, however, should be complete in itself. This would permit of withdrawal with profit at the end of any year. It would permit, also, of admitting for a year, or for two years, an older student who could not give longer time to the work.

b. Length of Session. — The year should begin not earlier than the middle of September, and close not later than the middle of June. This would make possible a school year of thirty-six weeks, or a school year of some fifty weeks, under a co-operative home and school plan. The period of each school day devoted to the school study and activities should probably not exceed six hours as a maximum. The time before and after the daily school session and on Saturdays would afford proper opportunity for day-to-day work at home, where continuity of effort, as in the care and handling of live stock, is a necessity.

F. Principles to be observed in Methods of Instruction. —

a. Interest. — The essential minimum of the study of books should be combined with the maximum attention to practical work. Things themselves should be handled, studied and rea-

soned about; operations, many in number and of an extremely practical nature, should be performed. General rules, statements or ideas may follow fresh handling of concrete detail, — they should seldom precede it.

b. Responsibility. — Active relationship to real life, and persistent participation in farming affairs while the student is yet in school, should be fundamental aims. Methods should be developed, therefore, which involve student ownership and home co-operation.

G. Gradation of Farming Activities or Projects. — *a. First-year projects.*¹ — The first year should deal mainly with projects which involve an elementary knowledge of soils and plant life, together with the mathematics related thereto. Kitchen garden vegetables and flowering plants should be grown.

b. Second-year Projects. — Certain second-year projects should involve extensive experimental study of agricultural botany; others should involve the scientific principles and the mathematics necessary for successful work in handling the smaller farm animals, such as poultry, pigs and bees.

c. Third-year Projects. — Fruit-growing and market-gardening projects should receive chief attention in the third year. The first principles of agricultural chemistry and the manipulation of the laboratory apparatus required for their elucidation should be mastered. Some attention should be given to the mathematics required for field surveys, for business transactions and for figuring the cost of producing and marketing the crops under consideration. A careful study should be made of the pumps, engines and other mechanical devices necessary for spraying.

d. Fourth-year Projects. — The major projects of the fourth year should deal with animal husbandry, including dairying. There should be one term of advanced agricultural chemistry. Here the greatest maturity in age and mental grasp have been attained. The largest money values are here involved, and the most difficult problems of land fertility, rotation of crops, rations, breeding and animal diseases are here to be finally dealt with. Farm management, law of contracts and farm accounts should be studied.

¹ The word "project," as here used, is defined in chapter V.

e. Possible Modifications.—It is believed that the above gradation of projects by years would be found a good outline for the development of courses of study suited to local needs. It would afford much flexibility as to details of schedules and instruction. At the same time it is recognized that other outlines worthy of approval may grow from year to year out of the work of the separate agricultural schools.

II. Good Citizenship.—Along with the major farming interests of these four years there should be developed the interests and powers of good citizenship, through reading, discussion of current events, and the clear and logical expression of ideas in writing and public address.

I. Home Residence and Work.—*a. Home Influence.*—Students should reside at home. The age of the students makes this desirable, if not imperative.

b. Home Experimentation.—Residence at home should vastly multiply the benefits of the school. There would be opportunity for the orderly but immediate trying out of new ideas and methods, where otherwise habits of postponement would be formed. From day to day the teachings of the school should be subjected, on a modest scale at least, to the practical tests of the home farm conditions of every student. In no other way can the maximum value of such a school be realized.

c. Home Credit.—Home work should be provided for in the system of marking, and full credit for it should be given towards graduation. For promoting a keen spirit of emulation, gatherings of pupils, parents and others should be held at the best farms, or where the teachings of the school are best exemplified. Prizes for excellence in home work should be awarded.

J. School Supervision.—Home work should not only be advised or suggested, it should also be actively supervised from month to month. At least one instructor should be employed for this purpose throughout the growing and harvesting seasons.

K. Student Ownership.—*a. At the School.*—All flower and vegetable gardening products of the student plots at the school should be the property of the students, provided the plots be regularly and properly cared for throughout the sum-

mer. The plots should be of such size that about one-half day a week during the summer would suffice for their cultivation. Experience has shown that plots of this size yield crops of sufficient value to repay the students for their work. Here school control should be absolute.

b. At Home. — Parents should give the students at least modest property rights at home, and exact proportionate responsibility and industry. Part of the garden might be given or rented the first year; a pen of poultry, a pen of pigs and a hive of bees, the second; part of the orchard, the third; and a cow, the fourth. Accurate account of outgo and income should be kept in all cases.

No better test of the practicability of the teachings of the school could be made. Though school control is likely to be more or less modified by home control, good results should still be had by proper choice of projects and harmonizing of interests.

L. School Operations and Products. — *a. School operations* should be primarily for educational purposes. A bad method may be followed, and beside it an approved method; the profit of one may, or may not, offset the loss of the other. Both together make a perfect demonstration for purposes of instruction.

The results of such demonstrations should be followed and observed at proper intervals by the students. They should be required to report at the school on the call of the instructor for noting the demonstration work of the school in connection with the instruction they have severally received.

b. School Products. — Apart from the products of the first-year gardening work, all products of the school farm should be disposed of for the benefit of the school. The operations of the school departments should be under the direct control of the instructors who teach the subjects the departments represent. Accurate profit and loss accounts for each department should be kept.

M. The Special School. — A separate agricultural school might be either general or special in character. If general, such a school would undertake, usually by a four-years course of training, to fit its pupils for at least the general lines of farm

production practiced in the surrounding territory. If special, a separate agricultural school might limit the length of its course to one or two years, and confine its instruction to a single specialized line of production, such as market gardening. Such a special school might receive students after they had spent two or more years in an agricultural school devoted to preparation for general farming; and it might also admit older students without previous preparation in a general school, if they were able to profit from the training offered.

N. More Advanced Education. — If on graduation a student should desire to enter the Agricultural College, one or two years of further study at his local high school should enable him to meet the conventional college entrance requirements. He might have to enter conditioned in one year of French or German; but a condition in such a subject could be easily removed, since credit should be given for his extensive agricultural training.

(3) *General Observations.* — That a thoroughly vocational education in agriculture can be given in the separate agricultural school, where properly equipped, has been sufficiently demonstrated by experience to be beyond the range of uncertainty. As noted before, however, such a school in this State should be so situated as to be easily accessible to 100 or more pupils; its plant would be expensive and its maintenance cost by no means small.

The separate agricultural school, as herein discussed, might be a local school, readily accessible to a considerable farming population, whose pupils lived at home and secured a part of their practical training through the directed performance of their duties on the home place; or it might be a boarding school for pupils gathered from a considerable area.

Such a local school is impracticable in agricultural areas intersected by mountains and pasture lands, where but a comparatively small number of suitable pupils are within daily travelling distance of a central point. Many communities of this type exist in Massachusetts.

Many towns or groups of towns, so situated, are able to maintain only moderate-sized high schools, and have within easy reach only a limited number of students. The taxable valuation

of these small centers of population would forbid the existence of so expensive an institution as the separate agricultural school. In a system of agricultural education designed to meet the needs of the youth of the entire Commonwealth, it would probably be necessary to provide either the boarding school of agriculture or the agricultural department in the public high school, for the training of the young people of the isolated communities.

The boarding school of agriculture is worthy of consideration, because of the attention which it has received in other States. It does not, however, seem necessary to adopt it under the conditions which prevail in a compact State like Massachusetts, where distances are so short and transportation facilities are so good. Rather it is believed that here the separate local agricultural school (without the boarding feature) should serve the needs of thickly settled farming districts; and that the agricultural department in the rural high school, as described in the closing part of this chapter, should, instead of the boarding school, train for effective farming those who live in the more sparsely populated farming communities.

2. SEPARATE AGRICULTURAL DEPARTMENT.

(1) *General Observations.* — In preparing this report, a careful analysis has been made of the conditions of the smaller communities as related to the necessary conditions of vocational education in agriculture, with the result that a type of school found developed to some extent in Canada suggests itself as being the most feasible means of meeting Massachusetts requirements. This has been styled the agricultural department of an existing high school, and contemplates the building up within an ordinary high school of a vocational department, corresponding to the vocational departments in commercial studies found in some village high schools.

From facts and conditions adduced below, it is believed that in some localities in Massachusetts, under very careful supervision, such agricultural departments would be possible, and could, if rightly administered, give genuine vocational training in agriculture. The "part-time work," or school and home-farm co-operative method, discussed in chapter V. of this report,

would, it is believed, make such departments vocationally effective as preparatory courses for productive farming in this Commonwealth.

(2) *Definition and Present Attempts.* — Vocational agricultural education as a separate department in a high school should be as distinctive in its object and atmosphere as is the separate agricultural school. Such a department would best be established in a secondary school which had a farming environment and an abundance of readily accessible illustrative material, in varieties of farm land, equipment, operations and products.

There are fourteen departments somewhat of this type in the Province of Ontario: six established in 1906, two in 1908, three in 1909 and three in 1910. It is intended to develop this work until every county in that province has been covered.

Work of like nature is now being given its first year of trial by the Friends' Bloomingdale Academy, Bloomingdale, Parke County, Indiana. The practical courses in farm management established by the Agricultural Guild of the University of Chicago, in 1908, utilize for practical experience farm equipment privately owned and land operated for economic purposes, as distinguished from land and equipment provided and maintained by endowment or public funds.

(3) *Minimum Standards.* — The agricultural department must maintain minimum standards of similar character to those fixed for the separate agricultural school. An outline is here given of vital factors for the success of such a department: —

A. Instructor. — There should be at least one specialist for instruction in agriculture. This teacher should be a man, should preferably have been brought up on a farm, and should, where practicable, be a graduate of an agricultural college. In short, he should be, first of all, practical, a man interested in farming and capable in farm work and management.

His time and attention should be devoted exclusively to farming subjects. His service should be rendered throughout the growing and harvesting seasons, in part as supervisor of school projects at the homes of the students, in part as teacher of agriculture at the school. He might also, if requested to do so, act as advisor among farmers in the vicinity of the school.

B. School Quarters and Equipment. — *a. Class Room.* — A class room should be given this instructor for his exclusive use. This should be on the ground floor, or in a high, well-lighted basement, and should be such as to permit of in-door demonstrations of farm animals, implements and machines. It might, or might not, be in the high school building.

b. Equipment and Appurtenances. — His equipment should at least include a Babcock testing outfit, seed-corn germinators, special agricultural physics apparatus, individual sets of gardening tools, hot beds and cold frames. Greenhouse space, though not more than a 6-foot by 30-foot lean-to, heated from the regular school-heating plant, would be an advantage; as would, also, be an acre of land for garden, nursery and demonstration plots.

c. Headquarters for the Instructor. — An office should be provided. This should be large enough for a library and reading room, and fitted up for such use. There should be furnished in this room as complete a file as possible of books, bulletins and periodicals on farming specialties.

C. Home Equipment and Co-operation. — Practically all the materials, implements and animals required for demonstrations should be brought to the school by the students, or should be examined on thrifty farms not too far distant. Everything examined would thus be part and parcel of actual farming outfits: each implement, animal and building would represent some farmer's judgment and money. The school would at every point be dealing with definite economic propositions.

D. Conditions of Admission and Promotion. — Boys above fourteen years of age should be admitted to the work of the agricultural department of the high school when, upon trial, they show themselves able to profit by the training, even though they have not satisfactorily completed all the work of the elementary school. Girls of the same age might attend certain classes. It would be necessary, as is pointed out at another place, for those pursuing the work of the agricultural department as an elective course to take all studies save the art and science of agriculture in the regular high school classes. No student should be prevented from attending the agricultural classes or

be deprived of promotion in them by inability to take high rank in other subjects.

E. Course of Study. — The agricultural department in the school should offer training in the practice and the science of agriculture. The course in agriculture should be elective to the regular pupils of the high school, and, as before said, should be open to those above fourteen who intend to be farmers, even though they might not be able to pursue successfully certain other branches of study offered by the school. Regular pupils pursuing the course in farming should be permitted to substitute satisfactory work therein for the requirements of the school in such cultural subjects as Latin or German, or for certain courses in physics, chemistry and biology.

In this way it would be possible and advisable that regular pupils, pursuing, as a legitimate part of their study, the course in agriculture, should at the close of a four years course graduate with their fellows, and receive a certificate or diploma setting forth the work which they had satisfactorily performed.

The school course should permit of continuous work at home, morning, evening and on Saturday, as in the separate agricultural school.

a. Dominant Motive. — As in the separate school, the atmosphere and the dominant object in the agricultural department should be agricultural and vocational. Much of this atmosphere might with profit be extended to other departments of the school. Contact with farming objects and activities would vitalize the instruction in the regular courses in science and in manual arts.

b. Grouping Studies and Students. — By putting first and second year students together in one class, and third and fourth together in another, each student would be given double the amount of distinctively agricultural training by the instructor which would be possible were the students handled in four divisions instead of in two. By the same means the efficiency and enthusiasm of the teacher would be multiplied. In alternate years the energy and attention of all could be concentrated now on animal husbandry and then on horticultural subjects, or *vice versa*.

c. Winter School at the Agricultural College. — Moreover, the regulations should permit a student who could meet the age requirement to take winter short courses, at least during his third and fourth years, at the Agricultural College, with no prejudice to graduation with his class; that is to say, credit for a short course at the college should be accepted as meeting in full the winter-term demands of any year at the school.

d. Schedules of the Instructor and Students. — The program should schedule the instructor for from sixteen to twenty periods a week during the fall and spring terms, and allow the winter term for his vacation. The instructor, in close connection with his class instruction, should be scheduled for inspection and advisory work at the homes of the students and among other farms throughout the summer.

e. Transfer of Students to a Special School. — Should a special school for such training as market gardening be established, with a one-year or a two-years course, a student desiring the special training of such a school might be transferred to it at the close of the second or third year of the general farming course of the agricultural department of an existing high school.

F. Support and Control. — *a. State Support.* — The salary of instructors for such departments would probably vary from \$1,000 to \$1,500 a year, and should be paid in part by the State, as elsewhere proposed in this report. (See Appendix, page 100.)

b. Local Support. — Quarters and equipment, and the necessary adjustments of curriculum for providing a well-balanced course of study, inclusive of the agricultural subjects, should be furnished by the local authorities. If the local school possessed wood-working, forging and drawing equipment, correlation of the manual arts work with farming would add decided value to the work of the agricultural department. The local authorities should also pay one-third of the instructor's salary.

c. Local Committee. — This department might be visited by a special local committee interested in practical farming, and the advice of such a committee might be sought in developing this branch of the work of the school.

d. State Supervision and Approval. — All matters relating to organization, control, location, equipment, courses of study,

qualifications of teachers, methods of instruction, conditions of admission and employment of pupils and expenditures of money, while immediately in charge of the local school authorities, should be subject to supervision and approval by the Board of Education.

G. More Advanced Training. — A student who had decided to go to college should find the same opportunities open for preparing himself for college entrance as does the student in the separate agricultural school. An unusually capable boy might carry a course in mathematics or a foreign language in the regular classes of the school while taking his agricultural course. On completion of his agricultural course, one additional year of study would perhaps suffice for completing his college preparatory work.

Up to this point this report has discussed the farming situation in Massachusetts that seems to justify a system of agricultural education for the Commonwealth, the types of vocational schools in agriculture that seem to be advisable for such a system, and the standards which should be insisted upon in order to make their work effective.

IV.

CO-OPERATION BETWEEN SCHOOL AND HOME FARM
NECESSARY TO AN EFFECTIVE SYSTEM
OF AGRICULTURAL SCHOOLS
FOR MASSACHUSETTS.

The previous chapter discussed the separate agricultural school and the agricultural department in a high school as desirable types of vocational school education in agriculture for Massachusetts.

It is the purpose of the present chapter to point out why co-operation between the school and the home farm is necessary, in order to make the work of such schools effective.

Vocational education is education that has for its controlling purpose the fitting of persons of either sex for definite callings or pursuits. Vocational schools of every type are coming to a recognition of the fact that practice and thinking about the practice, practical and technical training must go hand in hand in effective vocational education.

The reason is not far to seek. Most people learn better by seeing and by doing, than from books. The experience of a considerable portion of the pupils in industrial and agricultural schools proves conclusively that many persons who have been unable to master principles and theories as taught by the ordinary method of the book, have large power of mastering principles when these are approached through the background of their daily employment; and that, best of all, they possess large capacity to retain and apply knowledge so taught and so comprehended.

Practice and thinking about the practice constitute the key to the situation. Industrial and trade schools are securing the needed practice for their pupils to-day, either through school shops which they are endeavoring to make economically productive, or through the actual wage-earning occupations of the pupils. Thinking about the practice is secured by a properly selected and adjusted course of closely related studies

at the school in which part of their time is spent. The shop provides in illustrations and practical work the raw materials; the school, the finished educational product.

Farm Boys may be favorably placed, but require Concurrent Practice and thinking about that Practice. — Boys and girls who expect to follow farming for a living probably are not exceptions to the general rule. Vocationally effective education for them, also, must involve an intimate relationship between practical and technical training.

Related Study at the School. — The question now arises, Where is the boy to secure correct experience in farming? It will not be difficult for the school to give related scientific knowledge, provided the pupil brings to it a background of experience in agricultural activities that enables him to assimilate it, and provided he is able, through his practice on a farm of some type, to fix the principles and theories gained in the school room.

Previous Farm Practice not Sufficient. — It seems to be clear that the pupils of an agricultural school do not, as a rule, bring to their studies about agriculture a body of previous farm experience which the school can utilize in giving a working mastery of the principles and theories that lie back of the best practice. The greater number come from farm homes where they may, or may not, have been fortunate enough to receive directed practice in scientific agriculture. There is at least a slight movement from city to country. It may be expected that a small portion of the enrollment in agricultural schools of secondary grade will consist of city and village boys who have had no training in the routine of the farm. In order that such boys may bring to their training something like the same advantages possessed by the country-bred pupil, they should, if possible, previous to entering the school have spent at least one year on a farm. While this discussion is primarily concerned with the country-bred boy, it is, in the principles it lays down, equally or even more forcibly applicable to the city or village boy who has farming aspirations.

The previous farm experience of the country-bred boy may have been directed by a farmer who has been too hard pressed

by his own farm routine to reflect on his own practice in agriculture, or to direct the work of his son so that it might be most educative from the vocational point of view.

It is significant that many of those who are most desirous that their sons shall receive agricultural education through the instruction and direction of the school are among the most intelligent and prosperous farmers in the Commonwealth. They clearly see, for the reasons given in chapter VII., that even the best farmers cannot expect to be the best schoolmasters in this line of training.

The condition of Massachusetts farming in general is not satisfactory to the leaders of agriculture nor to the community at large. This means that most farm boys, so far as they bring farm experience to the school, are more likely to have been brought up to use bad or indifferent methods than to use the best.

Moreover, the boy of fourteen as a rule has been too young to have been able to reflect seriously or extensively on the problems connected with the agricultural activities which he has observed or in which he has had a part.

It is possible, even in the absence of closely related practice, to give much effective vocational training in the sciences related to different farming operations to those of mature mind who have had experience in them. A farmer, for example, who had formerly kept a herd of cows, might attend a course of instruction in the principles of scientific dairying. By this means he might make a second venture in that field more intelligent and more profitable. No one will question, however, that the dairyman who was able to put into immediate effect in his own herd the scientific knowledge gained in such a course would acquire a greater working mastery of the principles that lie back of the successful pursuit of his calling.

It seems to be clear, in short, that the more or less elementary, more or less undirected or misdirected, more or less undigested farming experience of the country-bred child cannot, in the absence of additional practical training, be made a safe basis for the effective teaching of agriculture as a vocation.

It is true that, on entering the agricultural school or an agricultural department in a high school, that boy or girl must

derive greatest profit who brings to the work the richest store of previous practical farm experience; but even with the best-prepared pupil it will not be safe to suppose that farm experience of the younger years will be found fixed and vivid in the memory, to be drawn upon at will, as the classroom discussions shift now to one phase and now to another of farming.

Past experience may aid in the work, and will do so to the extent to which that experience was intelligent and to the extent to which it remains vivid. Practical farming and the book study of the subject, concurrently carried on under the direction of a specially prepared instructor, appear to be the only certain method of securing these ends. Thinking may refer back to this experience to some extent; it must to some extent anticipate future activity; but in the main it is believed that the training of the agricultural school, to be effective, must at once provide, and thereafter concurrently interrelate, as far as possible, these two supplementary processes, — directed farm practice and study about that practice.

Provisions for Proper Farm Practice. — How many school authorities secure for pupils seeking preparation for profitable agriculture properly directed experience in farming processes? Agricultural schools of every type, in order to be effective, should, it is believed, provide at least a small equipment on or near the school premises, for observation and demonstration work in correct methods of farming. Such an equipment would be possible in the typical rural community. A few communities may be sufficiently prosperous to establish and maintain agricultural schools equipped with the farming plant, equipment, animals and materials necessary to diversified and effective training in the arts of agriculture. Such an outlay of public money probably lies, if not beyond the resources, at least beyond the civic power, of the typical rural community which most needs agricultural education.

If agricultural schools could be equipped with extensive school farms, it would be necessary, in order to secure the best results, that pupils should devote a considerable portion of their time, now employed at home, particularly in the growing season, to directed activities on the school premises. But it would

be impracticable to withdraw to any great extent boys from service on the home farm for service on the school farm. Furthermore, all the operations connected with the tillage of the soil, such as the care and observation of experimental tracts, lack significance until the seasons of growth and harvest, — seasons that find the school session ended, and the pupils widely scattered and possibly engaged in cultivating or harvesting the crops on the home farm.

As the most promising solution of the problem of securing effective vocational training in agriculture, this report recommends that the home farms of the pupils be utilized in what may be termed “part-time work” in agriculture.

Part-time work in agriculture would be utilizing home land, equipment and time, outside school hours, for practical training supervised by the school. The term “part-time work” is a descriptive expression, brought over from current discussion of certain forms of industrial training, for use in unfolding the possibilities of this proposed type of training in the field of education in agriculture. Part-time work in industrial education means that the student spends part of the time required for his training in a shop or manufacturing establishment, and part of the time at the school building; both school and shop work, however, being intimately related and supplementary to each other.

Part-time work as applied to agricultural education would mean that the student must spend part of the time required for his education in productive farm work, preferably at home, and part of his time at the school; the farm work and school study to be closely correlated by the school at points selected from season to season or from year to year, and to be given the highest possible educational value by competent school supervision.

Equitable. — The same causes that have brought about a widespread demand for co-operation between school and shop in industrial training, make just as necessary similar co-operation between the school and the home farm in agricultural training. Historically, shop and farm at one time gave the youth all his vocational training. Of late the tendency has

been, under the stress of modern conditions, to throw upon the schools almost the entire responsibility for the industrial and agricultural education of minors. It is becoming increasingly apparent that the school cannot meet this difficult and expensive burden, unaided. It would therefore seem to be equitable that the schools should bestow the related theoretical instruction which they are so well designed to give, leaving to factory and farm the task of giving, under expert direction, the practical experience which they are well equipped to confer.

Economical. — Such part-time work would reduce the cost of agricultural training of secondary grade so as to place effective training for the farm within the reach of many communities which would otherwise be unable to secure it. Part-time work would obviate the necessity of sending the boy away from home in order to secure the benefits of agricultural training. The cost of living for the boy would be less at home than at a boarding school. Parents would be deprived of the services of the boy during only a portion of the day.

Effective. — Co-operative work between the school and the home farm would be the most effective known means of trying out, under the conditions of individual farms over widely scattered areas, methods which have proved to be profitable elsewhere, as, for example, at the State Agricultural Experiment Station. Such co-operation would furnish the only experimental means by which each boy could try out the merits of the home farm as an agency for producing profits, when treated by the best-known methods; that is to say, part-time work would furnish the only means whereby the principles and methods taught by the school could be positively adapted by the boy to the economic conditions on the farm on which he might spend his working days. Part-time work thus should give to agricultural teaching the reality of actual life, as but little school training can give it.

Conclusion. — It is believed, in short, that every purpose of economy in the establishment and maintenance of a system of agricultural schools, and of efficiency in the education provided, would be insured by utilization to the largest possible extent of home land, equipment and time in the training of boys for the successful pursuit of farming in this Commonwealth.

V.

THE PART-TIME AND PROJECT METHOD NECESSARY
TO AN EFFECTIVE SYSTEM OF AGRICULTURAL
SCHOOLS FOR MASSACHUSETTS.

The present chapter outlines a method by which, it is believed, education through the plan of "part-time work" in agriculture, recommended in chapter IV., may be made effective.

Under the "part-time work" plan, developed into a system for the whole State, centers would be selected. The instruction would be adapted to the kinds of farming prevalent in the districts surrounding those centers. The practical applications of the instruction would thus be subject to the obstacles continually encountered under the economic farming conditions found in any given district; just as they would, also, be aided by all the influences in this Commonwealth which make for the improvement of farming. The plan, as an educational process, is believed to possess unquestionable merit, because farming activities would readily resolve themselves into what may be termed farming "projects."

A Farming Project is a Thing to be done. — 1. *Improvement Projects.* — The thing done might contribute some element of improvement about the farm, as constructing a concrete walk leading to the front door, the planting and nurturing of shade trees, the making and maintaining of an attractive lawn.

2. *Experimental Projects.* — The thing done might be of an experimental nature, as the planting of an untried variety of fruit, the feeding of an untried ration, the testing of an untried spraying mixture, or the testing of one or another of much advertised roofing materials.

3. *Productive Projects.* — Finally, the thing done might be of a productive nature, as the growing of a crop of clover or alfalfa, the growing of a field of potatoes, the growing of a crop of silage corn, or the production of eggs for the market.

A Farming Project is, further, Something to be done on a Farm, which would involve a Limited and Definite Amount of

Equipment, Materials and Time, and which would be directed toward the Accomplishment of a Specified and Valuable Result.

— 1. *Improvement.* — An improvement project might be limited, for example, to a given length and width of concrete walk, constructed of a given kind of stone, sand and cement, costing not to exceed a given sum of money, and requiring not to exceed a specified amount of time.

2. *Experimental.* — An experimental project might be limited, for example, to the planting of a given number of trees of an untried fruit, on a piece of ground which could well be spared for such a hazard, and involving a cost in time and money which it was felt could be afforded at a given time for this risk.

3. *Productive.* — A productive project might be limited, for example, to the growing of a given area of clover or alfalfa, at a given cost for seed, fertilizer and labor, and for the securing of a specified quantity and value of feeding stuff or roughage.

Finally, a Farming Project, as the Term is here used, is a Thing to be done on a Farm, which, in the Preparation for doing it and in the Carrying of it out to a Successful Result, would involve a Thorough-going Educational Process. — 1. *Improvement.* — The improvement project of constructing a concrete walk to the front door might involve the study of the nature of cement; its action on sand and gravel or broken stone; its resistant qualities to the weather; the seasons at which it could be used; its cost, as compared with other materials, such as boards, plank, tar, brick, flagging and asphalt; the mathematical determination of the proportions of cement, sand and stone to be used; the geometrical determination of the sections into which it should be divided, and whether it should be crowned or flat; the geographical sources of the raw material; and the market conditions for purchasing cement.

2. *Experimental.* — The experimental project of planting an untried variety of fruit might involve the study of the probable adaptability of the variety selected to the soil, the climate and the market demands within reach of the farm.

3. *Productive.* — The productive project of growing a crop of clover or alfalfa might involve the study of the various varieties of clover; the comparative adaptability of these varieties

to the given field on which the crop was to be grown and to the climate of the locality; the most reliable places for the purchase of seed; the best time for seeding; the best time for cutting; the best methods of curing and storing; the mathematical calculation as to the saving in cost of feeding stuffs which the crop would afford; the chemical elements it would furnish in the ration; and the chemical, biological and mechanical effects on the soil in which it would be grown.

A Complete Definition of a "Project" as here used has Three Elements. — Thus, it will be seen that a complete definition of a farming project as here used involves the three elements of (1) something to be done on a farm, (2) under specified conditions and for a specified valuable result, and (3) requiring a thorough-going training.

Project Fields or Classes. — There are certain broad, general fields in which numerous projects might be found. Among these are: —

- Vegetable gardening.
- Flower gardening.
- Landscape gardening.
- Orcharding.
- Small fruit growing.
- Growing of general farm crops.
- Farm forestry.
- Greenhouse crops.
- Production of poultry products.
- Beekeeping.
- Swine husbandry.
- Sheep raising.
- Horse raising.
- Dairying.
- Agricultural physics and mechanics as applied to farm buildings, drainage, irrigation, and providing and maintaining farm machinery.

Major Projects. — Projects within the above general fields might be major projects. Of major projects, the following may be given as examples: —

1. *Caring for the Kitchen Garden.* — Under the direction of

the school, a boy over fourteen years of age might be required or permitted to cultivate the kitchen garden for supplying the family with vegetables or small fruit.

2. *Keeping a Pen of Poultry.* — Under the direction of the school, he might be required or permitted to keep a pen of, let us say, twenty-five birds, for the purpose of producing a net profit on the enterprise.

3. *Caring for a Selected Part of the Orchard.* — Under the direction of the school, he might be required or permitted to care for a part of the home orchard, say five apple trees, so as to improve the quality of the fruit and thus gain a larger net return.

4. *Raising a Specified Crop of Potatoes.* — Under the direction of the school, he might be required or permitted to raise on the home farm an acre, or a tenth of an acre, of potatoes, according to his age and strength, so as to secure the best possible crop and the largest possible financial return.

5. *Caring for One Cow.* — Under the direction of the school, he might be required or permitted to care for one cow in the home herd, with a view to securing from her the highest production of which she was capable, and to determining whether she were yielding an adequate profit.

Major and Minor Projects. — While the above does not constitute by any means a complete list of possible major projects, it is intended to be suggestive of the many and diversified kinds of projects that might be feasible for use in the part-time work under consideration. A major project may include a great many minor projects.

Minor Projects are related to Major Projects as Parts to the Whole. — Minor projects include all the diversified activities which the boy must perform in order to bring the major project which he had undertaken to a successful conclusion.

Details of a Project Suitable for First or Second Year Instruction. — Later in this discussion (pages 56-60) details are given of a project suitable for use with third or fourth year students. The subject in that case is a staple product likely to be grown on every farm, or at least in every farm garden.

At this point in the present chapter it is desirable that the possible working out of the project method of instruction should be illustrated by details of a subject which would be suitable for use with students of the first or second year.

In the list of major projects above given, the second, "Keeping a Pen of Poultry," will, perhaps, best serve this purpose. This project permits of clear analysis. It is sufficiently familiar to make intelligible such technical terms as it may be necessary to use. It deals with a branch of agricultural production found on every farm and at many village homes; yet a branch from which, when conducted on a strictly business basis, it is very difficult to make a profit. It has to do with farm products which are of very great economic importance for the advancement of agriculture in this State; since Massachusetts, while admirably suited for poultry keeping, imports \$25,000,000 of poultry and eggs annually, and produces less than \$6,000,000 worth per year. (See "Agriculture of Massachusetts," the report of the Secretary of the State Board of Agriculture, 1909, page 119.)

Owing to the attention now being given poultry keeping by the agricultural colleges and experiment stations, materials for teaching the subject scientifically and practically are increasing, and make this one of the most promising lines of project instruction for school use. Poultry keeping affords one of the best projects for transition from the boy's treatment of animals as pet stock to his treatment of them as vital factors in economic agricultural production.

Important as this poultry project is, however, it will, of course, be understood that there are many other projects suitable for first and second year use. This project is but a single example of the many which might have been given.

Minor Projects. — Suppose the major project in preparation for purposes of instruction be No. 2, above given, "Keeping a Pen of Poultry." Then certain minor projects necessary for carrying out this major project might be: —

1. *The building of a poultry house* (if necessary), according to plans and specifications worked out at the schoolhouse. This minor project in turn could be broken up into a number of

subordinate minor projects necessary to its successful completion, such as: —

(1) *The Selection of a Site for the Poultry House.* — Here the decision made might take into consideration: —

- A. The suitability of the soil for poultry culture.
- B. The condition of the underdrainage of the site, and the possibilities of securing proper surface conditions.
- C. Conditions of sunlight and shade as factors in the proper care of fowls.
- D. Convenience of access from house and barn.

(2) *The Adoption of a Plan for the Poultry House.* — Here the decision made might take into consideration: —

- A. The style of construction best adapted to the purpose for which the structure was to be used.
- B. The size of the poultry house necessary to the success of the project.
- C. The fittings which would be most sanitary, most convenient, and therefore on the whole most economical.

(3) *The Materials entering into the Construction of the Poultry House* (involving kind, cost and availability). — Such questions as these would naturally present themselves: —

- A. Should the foundation be permanent, or temporary?
- B. What sizes of dimension stock would be required?
- C. Should the flooring be earth, boards or cement?
- D. Should the siding be rough, or planed; matched, battened, or protected by paper?
- E. Should the roofing be shingles, matched or battened boards, metal, or some form of patented roofing of the rubberoid type?
- F. Should the building be painted; and, if so, what would be the best-wearing and most economical color and mixture? When should the paint be applied?

2. *The selection of birds*, as determined by the purpose in keeping them (whether for show stock or utility, breeding or egg producing). This minor project in turn might be broken up into a number of subordinate minor projects necessary to its successful completion, such as: —

(1) *The Choice of Type and Breed.* — Such questions as these would naturally present themselves: —

- A. Is a meat type of bird desired; and, if so, what is the best breed or type? Is color of any importance?
- B. Is the egg type desired; and, if so, what variety? Should the color of the egg be a determining factor?
- C. Among what may be termed general-purpose types, what may be considered the best stock both for egg production and for final finishing as table birds?

(2) *The Choice of Breeding Stock.*

- A. When should breeding stock be selected and assembled for production of the eggs required for hatching?
- B. Should close attention be paid to breed shape?
- C. To what extent and for what reasons should color and plumage be determining factors?

(3) *The Choice of Method of Beginning the Project.*

- A. Should the beginning be made with eggs; and, if so, where can the eggs of the breed and type desired be secured? What would they cost, and when should they be ordered?
- B. Would it be more economical to begin operations with incubator chicks a few days old? If so, where could such chicks be had, when could they be had, and at what cost?
- C. Should the beginning be made with full-grown birds? Where could they be had, when, and at what cost?

3. *The Feeding of the Poultry.* — This minor project might in turn involve a number of subordinate minor projects necessary to its successful completion, such as: —

(1) *The Selection of the Kinds of Feed.* — Such questions as these might naturally present themselves: —

- A. When should hard grains be used?
- B. What are the merits of ground grains, as distinguished from hard grains?
- C. Under what circumstances are mixtures and mashes desirable? Should these be fed wet, or dry; and should they be home-made, or bought on the market?
- D. In what proportions should animal feed be provided, and in what form or forms could it be most economically fed, — in beef scraps, for example, or in green bone?
- E. Should green feed be furnished? For winter feeding, what quantity, if any, of cabbages and roots should be stored?

(2) *Working out Problems of Feeding.* — Such questions as these might naturally present themselves: —

- A. To what extent should there be a variety of feeds?
- B. What relationship do feeding and exercise bear to each other?
Should dry grain be fed in the litter, or be fed in hoppers, or both? What differences should there be, if any, between feeding on free range and feeding in confinement?
- C. What part should grit, oyster shells or charcoal form of the ration, and for what reasons?
- D. To what extent might feeds be grown at home, and to what extent must they be bought on the market?

4. Other minor projects within the major project of “Keeping a Pen of Poultry,” which might also be analyzed into numerous subordinate minor projects, each necessary to the successful performance of the larger minor project and the major project of which it forms a part, are: —

- (1) The production of eggs with profit.
- (2) The production of chicks by incubator.
- (3) The care of chicks by artificial brooding.
- (4) The rearing of chicks.
- (5) The handling of young stock.
- (6) The fattening and killing of poultry.
- (7) The marketing of eggs and birds.

In like manner, every major project similar to those heretofore described, chosen by the school for purposes of instruction, might be analyzed into the minor projects of which it was composed, both in order that the various activities of the boy in the successful accomplishment of the major project might be effectively directed and supervised, and, as we shall see later on, in order that the theories and principles related to the different phases of his task might be given at the time when they would be most effective from the practical and the educational points of view.

Three factors must, it is believed, determine the measure of success in any given plan of part-time work in agriculture: (1) the farmer and his farm; (2) the school and its agricultural supervisor; (3) the boy and his projects.

1. *The farmer and his farm* must constitute the fundamental

factor in the practical training of the boy. There could be little effective work in the field of part-time training for the farm without a reasonable spirit of co-operation on the part of the parent.

There are at least three ways in which the parent could aid in making the directed farm experience of the boy more educative: (1) in the use of the home plant; (2) in the use of the home time of the pupil; (3) in giving the boy's projects economic importance.

(1) *In the Use of the Home Plant.* — One of the most essential features of the co-operative part-time plan between home and school is that the parent should be willing to devote from time to time, in accordance with the plans of the supervisor or teacher in charge of the work, a reasonable portion of his buildings, orchards, garden, pasture, forest and other fields, and of his implements and machines, animals and materials, to the directed training of the boy.

(2) *In the use of the home time of the pupil* the fullest value of the agricultural course will come from the fullest possible participation of the boy in the ordinary routine of farm work as usually carried out by the parent; but the greatest benefit of the school cannot be had without the use of a part of the boy's time, during the hours spent at home, for strictly school purposes. The following are a few of many illustrations of what might be the directed use of a part of the home time of the pupils in the pursuit of projects suggested and directed by the school: —

- A. The boy might help with the milking throughout his course, where the object was to get the cows milked as quickly as possible, and where no records were kept. During certain months of at least one year, the school should require whatever time might be necessary for keeping an accurate record in pounds and ounces of the yield of a part of the herd. This might be limited to the weighing of milk from a single cow, and giving the cow credit for what she produced.
- B. It might be part of the boy's business to assist in feeding the cows. During part of his course, sufficient time should be given for weighing the ration and charging at least one cow with what it cost to keep her.

- C. In the ordinary routine to which he had been accustomed in milking, much or little attention might have been paid to cleanliness of cows, utensils or the person and clothing of the milker. During part of his time in school, the boy should be given whatever time might be necessary for milking at least one cow and preserving her milk under absolutely sanitary conditions, and for sampling the milk for bacteriological tests.
- D. In the ordinary cropping of the farm, much or little attention might be paid to leguminous crops. But during one season at least, facilities should be given the pupil for growing a patch of moderate size of clover, and for observing the effect of introducing a large proportion of clover into the ration of the cow.
- E. In the ordinary conduct of the farm, much or little attention might be paid to the selection and testing of corn for seed. But prior to planting, one season at least, the boy should be given whatever time might be necessary for making germination tests of the corn which it was proposed to plant.
- F. Also, during one season, the boy should be given control of a portion of a corn field for making an "ear to row" corn test; for observing the difference in yield from different ears of corn,—all the corn from one ear being planted in one row and all the corn from another ear being planted in another row.
- G. In the ordinary routine of the farm, it might be the business of the boy to tend the poultry. During at least one year, he should be given control of at least one pen of poultry, and facilities for feeding a balanced ration and trap nesting individual birds for comparison of productivity in laying.
- H. It might be part of the usual work of the boy to help cultivate and harvest the potato crop. During one season at least, he should be given facilities for testing the value of the use of formalin for the prevention of potato scab, and of the Bordeaux mixture for protection against potato blight.

(3) *In giving the boy's projects economic importance*, the active aid of the parent would again be almost indispensable.

A. *Keeping Accounts.*—Whether or not the parent were in the habit of keeping books, it would be vital to the success of the school training that accurate accounts of outgo and income should be kept with regard to certain home projects directed by the school. Every boy should be taught business-like methods for carrying on work. Modern business methods provide for discovering exactly where money is made, and where it is lost, at any stage or in any part of a given enterprise.

The boy should be given opportunity for testing, under his home conditions, the value of methods which have proved efficacious in business. The school, to be effective, must teach economic production in every phase of farm life for which it gives preparation. Moreover, accounting is necessary to any intelligent comparison of the effectiveness of the method advocated by the school with that of the method previously followed.

B. Projects as Business Enterprises. — If the experiences of the boy in the farming projects are to be educative to the largest degree, it is believed that they should be conducted strictly as business enterprises. Four methods of meeting the problem of the cost and profit of these directed farming operations would be possible: (*a*) the parent might meet all the cost, and give the boy all the profit; (*b*) the parent might meet all the cost, and retain all the profit; (*c*) the parent might meet all the cost, and share the profit with the boy; (*d*) the boy might receive the net profit, after the cost of the project had been paid.

From the educational point of view, the last method, by which the boy, after conducting the given project as a business enterprise, should profit only to the extent to which his total receipts exceed the total cost of the enterprise, is believed to be in every way preferable. By this method the boy would learn, once for all, through his own experience, that there can be no product without cost, and no profit without excess of receipts over all expenditures. After such an experience, he would not be likely to undertake a new enterprise without a serious attempt to estimate accurately his probable profit. The boy would be subjected to the prevailing economic conditions under which the home farm must yield a profit, or a loss, at the end of each year of work.

The method by which the boy became on a small scale a farmer or a business man for himself would give the project which he was carrying on a reality not otherwise attainable, that must heighten measurably his interest in the work and in the related study of the school, and must fix better than by any other device the training which he was receiving.

Incidentally, it may be remarked that, as a matter of public spirit, the citizens of the community might do much to further

the objects of the school by admitting the agricultural instructor or supervisor and his students to their premises, for the examination of animals, machines and all out-door and in-door operations, and by explanation and discussion of their methods of accounting and their improved farming processes. At another point in this discussion the possible fields of usefulness to a community of such an instructor or supervisor are pointed out. Effective service on the part of the supervisor in the field of helpful suggestion there mentioned could be rendered only where there was a cordial attitude of co-operation on the part of the people in the community who were desirous of either the improvement of rural conditions in general or the betterment of their own farms.

2. *The School and its Supervisor.* — Whether part-time work in agriculture were conducted under the auspices of a separate agricultural school or of a separate department in a regular high school, it is believed that it would require the services of a trained and experienced agriculturist, who should devote his entire time to teaching the principles and the best methods of farming. It is believed, further, that largely through this instructor or supervisor of agriculture the school should: (1) choose the projects to be undertaken by the boy; (2) direct his work in the discharge of his projects; and (3) put him in possession of the principles that relate to them.

(1) *In the selection of the projects to be undertaken by the boy*, the instructor should take into consideration: —

- A. What farming enterprises are profitable, or could be made so, in the neighborhood.
- B. The age of the boy.
- C. The kinds of projects that would be feasible on the home farm.
- D. The boy's routine farm work at home.
- E. The assistance that the father could afford to give in materials and equipment.
- F. The suitability of the project to the season of the year.
- G. The projects and portions of projects that could best be carried out at the school, and the best time on the program of the year for these parts of the work to be done.

The problem of the building of a poultry house by the boy would be one of the possible minor projects, as before shown, when the larger project of keeping a pen of poultry was under

consideration. This problem would naturally involve such questions as these:—

- A. Would the student have the necessary time?
- B. Could the necessary materials be provided by the parent or student?
- C. How much personal supervision of the actual work of construction would be necessary or advisable on the part of the supervisor?
- D. Would profitable poultry keeping on a given home farm require the improved accommodations which the model poultry house, built by the student, would furnish?
- E. How far would conformity to the standards set up by the school be necessary in determining what would be a model type of poultry house for a given farm?
- F. In what year of the school course should the building of a poultry house be undertaken, in order that the training in poultry keeping might be made most profitable?
- G. What time of the year could the student build a poultry house to best advantage?

The problem of conducting the building of the poultry house as a strictly business enterprise is a project which would naturally involve these questions:—

- A. To what extent, if at all, could the boy be required to meet, or be charged with, all cost save his own labor, and be credited with a fair inventory valuation of the completed structure?
- B. If the parent must advance the money or materials, what rate of interest, if any, should be charged the boy?
- C. What method of accounting should be adopted?
- D. Should such records be kept as would enable the cost of this building to be compared with other similar buildings in the neighborhood, as a check upon the business-like character of the boy's working out of this project?

(2) *In directing the work of the boy in the discharge of his projects*, the school must of necessity, it is believed, undertake the supervision of a portion of his work at home. Supervision of part-time work in agriculture would not be an attempt on the part of the school to interfere with the private management of the farms of the parents. Supervision would, nevertheless, be a continuous effort by the school to assist, advise and encourage the students in applying under home conditions, farm methods which had proved successful elsewhere, and thus to cause the practical training of the students to result in vocational efficiency.

The instructor would not undertake to supervise all the details of the farm management on any given farm. Daily supervision would be impossible, because of the number of farms to which the work of the school must be extended. Excessive attention to minute details of farm work on the part of the instructor might create needless friction between himself and the parent, or might interfere materially with the supervision of a proper amount of project work. It is, therefore, not contemplated.

The school should not, it is believed, undertake to shift responsibility for the economic management of a farm from the shoulders of the parent to the shoulders of the public.

The instructor would undertake to supervise certain selected major projects and their related minor projects performed by the boy at home. In a given year and season attention might, for instance, be concentrated upon the project of keeping a pen of poultry. Having given the study related to this project, the instructor would supervise the application of that study. The following examples illustrate what the character of such supervision might be:—

- A. In the building of the poultry house, the actual work of putting up the structure might, or might not, be supervised by the instructor. All other elements or phases of the enterprise, as indicated by the outline, should be worked out by the student under the direction of the school.
- B. The course in farm shop work of the school might well undertake to deal with the problem of the actual construction of the poultry house.
- C. It would be the duty of the instructor or supervisor to canvass thoroughly with the student the relative merits of different types and methods of poultry keeping, from the points of view before indicated. His supervision might go the extent of passing judgment on any proposed purchase of breeding stock, chicks or eggs.
- D. The supervisor would not personally direct the daily routine work of feeding and watering poultry. His duties would consist of directing the thorough study of possible feeds and mixtures, their comparative cost and availability, and their suitability to the age, condition and purpose of the student's particular birds. For such supervision personal knowledge by the instructor of the exact home conditions would be necessary.

The supervision of the practical home work of the boy or girl would naturally follow the settlement of such problems as these: —

- A. How could supervision and instruction be closely correlated?
- B. How should the time of the instructor and of the pupil be apportioned between home and school duties?
- C. What would be the maximum radius, from the school building as a center, of effective supervision?
- D. What methods might be employed for securing and holding the co-operation of the parent and the community?
- E. By what means might satisfactory standards in the practical work of the student be maintained?

Thus far we have discussed the duties and responsibilities of the special instructor or supervisor of agriculture *in the field of direction* of the boy's projects on the home farm.

The instructor might undertake to give help to others than those connected with his school. There are not wanting those who believe that such an agricultural instructor attached to a regular high school might render valuable service to the community in which he was employed, in what might be termed *the field of suggestion*. Considering the previous training and experience required of this instructor, he should be a man well prepared to be of wide assistance in a farming community as an advisor in emergencies which called for special knowledge and skill. If met by a problem with which he could not cope unaided, — and there might be many such problems, — he would know the best men, books and bulletins for consultation in such emergencies. Such problems might arise from attacks upon crops by injurious insects or by fungous diseases.

The friendly advice which the agricultural instructor might give need not mean a meddlesome attitude on his part. His suggestions would not be given save when requested, or when it was evident that they would be welcome.

The field of suggestion would naturally begin with farms represented in the school by students. The instructor would of course stand ready to give the parents any advice of which he might be capable, or to get for them, or instruct them how to get, any information which they might need or desire. With the

gradual extension of his knowledge to the other farms of the community, he might be expected to stand ready in a similar manner to be of assistance to the owners of those farms.

3. *The boy and his projects* form a natural connecting link between the farmer and his farm, on one hand, and the school and its instructor, on the other. At the farm, the pupil deals with the practical aspects of his projects; and at the school, with their scientific aspects. The foregoing discussion has been devoted chiefly to the practical aspects of the proposed project method of instruction. The present section lays strongest emphasis on the related study essential for the successful carrying out of a particular project.

Details of a Project Suitable for Third or Fourth Year Instruction. — Earlier in this chapter a project was dealt with which might, for the most part, be successfully carried out by a first or second year student. For the present discussion a project has been selected which would require considerable maturity of age, strength and training for its successful accomplishment. It is true that simpler problems in potato growing have been successfully carried out by elementary school pupils; but even a glance over the elements which enter into the project now to be outlined will show that problems altogether too serious to be comprehended or undertaken by the younger pupil are here involved.

It is to be understood, of course, that the following project is but one of many which might be selected.

(1) *Major Project.* — It is assumed that the boy has chosen for his major project the development of a method for increasing the profit from the potato crop customarily grown on the home farm. It is further assumed that 5 acres of potatoes are generally grown; that this year the crop is to be grown on clover sod; that the variety of potatoes to be grown has been chosen by the father; and that the boy's father is willing that his boy shall have complete control of a given number of rows of the 5-acre field, and shall be furnished the necessary tools and materials for his project.

(2) *Minor projects* necessary for carrying out the above major project might then be as follows: —

A. Insuring the most abundant crop by:—

a. A Proper Seed Bed.—The related study here would involve knowledge of:—

- (a) Conditions of soil, air, texture, temperature and moisture most favorable to the growth of the potato plant, including methods of reducing an undesirable amount of “free” water, of avoiding too great dilution of plant food, and of securing a desirable amount of “film” water.
- (b) Methods of preparing the seed bed, including the comparative advantages of fall and spring plowing, and the best treatment of the land in the spring after plowing and prior to planting.

b. Proper Fertilizing.—The related study here would include knowledge of:—

- (a) Chemical composition of the potato plant, its osmotic and digestive processes, and the quantity of available fertilizing materials it is capable of assimilating.
- (b) Complete fertilizers for the production of potatoes, including analyses of standard fertilizers, and the plant-food values for potato growing of chemicals and mixtures offered for purchase.
- (c) Comparative desirability of muriate and sulphate of potash for producing a crop to be disposed of in an immature state as new potatoes, or for producing a crop of late potatoes to be disposed of for winter use; and the extent to which the “mealy” character of the mature crop should be the determining factor in choosing between these two kinds of potash.
- (d) Clover sod as a factor in determining the proportion of nitrogen to be supplied.
- (e) Best formula for a complete fertilizer for this particular crop, taking into account the potato plant, the previous crops and their fertilizer treatment in the system of crop rotation followed on the home farm, the present soil conditions and the purpose of the crop.
- (f) Most liberal amount of fertilizer warranted for use in growing this particular crop, in view of the known condition of the land and the assimilative powers of the potato plant; and the saving in cost by home mixing of the supply to be used.

c. Using the Best Seed.—The related study here would include knowledge of:—

- (a) Botanical characteristics of the potato plant; the difference between a seed and a tuber; and potato improvement by various methods and conditions of propagation, taking into account tendencies of the potato plant to "variation" and to "mixing in the hill."
- (b) Importance of planting "seed" selected in the field from the best-yielding hills, rather than seed selected from the bin merely by size of tubers.
- (c) Advantage of using potatoes for planting which have been properly stored, and the effects of freezing and sprouting in the cellar.
- (d) Conditions under which it may be desirable to sprout potatoes to be used for planting, in a warm, well-lighted room, — the temperature, the time and the care in handling required for such sprouting.
- (e) Size of piece and number of eyes to the piece, as important factors in starting the crop and in the quantity of its yield.

d. Proper Planting. — The related study here would include knowledge of: —

- (a) Botanical and chemical characteristics of the potato plant, as to its feeding habits, the growth of the tubers, and the effect on the tubers as food products of exposure to the sun during their growth.
- (b) Distances between rows, and between seed pieces in the row.
- (c) Depth of planting, in its relation to protection of the tubers from the sun, shielding the crop from possible rot-producing bacteria and spores, and subsequent cultivation, whether by the "level" or by the "hill" method.
- (d) Best time for planting, whether for "early" or for "late" potatoes.

e. Proper Spraying. — The related study here would include knowledge of: —

- (a) Botanical characteristics of the potato plant, particularly the relation of health and luxuriance of foliage to tuber production.
- (b) Insect enemies of the potato plant, and their entomological characteristics, such as their methods of propagation and their feeding habits.
- (c) Depredations of insects, and their possible relation to attacks upon the potato plant by plant diseases.

- (d) Paris green: its chemical composition; its protective action against the insect enemies of the potato plant; dangers attendant upon its use; its possible combination with Bordeaux mixture; and the best formula, method of preparation and periods for its application.

f. Proper Cultivation.—The related study here would include knowledge of:—

- (a) Physical characteristics of the soil, particularly the capillary movement of water to the surface of the soil, and exhaustion of soil moisture by evaporation.
- (b) Surface conditions most favorable for receiving rain water without washing, puddling or subsequent baking.
- (c) Value of a "soil mulch," and the most desirable method and frequency of cultivation for maintaining such a mulch.
- (d) Comparative cost and advantages of "level" and "hill" cultivation, and reasons for the choice of the particular method to be followed in cultivating the present crop.

B. Insuring the cleanest crop by:—

a. Dipping the "seed" potatoes in a formalin solution. The related study here would involve knowledge of:—

- (a) Plant parasites which produce "scabby" potatoes, and the biological conditions favorable and antagonistic to their growth.
- (b) Formalin solution: its chemical constitution; its chemical action on these damaging potato parasites; and the proper formula and method for its use in protecting the potato crop.

b. Substitution of chemical fertilizers for barnyard manure. The related study here would involve knowledge of:—

- (a) Dangers of infection from the use of barnyard manure.
- (b) Dangers of infection, if any, from the use of chemical fertilizers.

C. Insuring the soundest crop by spraying the potato plants with Bordeaux mixture. The related study here would involve knowledge of:—

- a.* Bacterial and fungous diseases to which the potato plant is subject; evidences of their presence; and whether or not they are preventable.
- b.* Bordeaux mixture: its chemical composition; its protective action against potato-plant diseases; and the best formula, method of preparation and periods of application for its use.

D. Other minor projects would include the most profitable means and methods of harvesting, storing and marketing the crop. And other study related to these projects would include knowledge of potato implements and machines and their use; the comparative advantages of field pit and cellar for storage; principles and means of ventilation, and the temperature at which potatoes should be kept; near and more distant markets, and comparative transportation cost; prices and the probable tendency of prices, in view of the press and government reports of the potato crop for the State, New England, the country and the world.

General Observations on Related Study. — The study related to the work of carrying out this potato project embraces, therefore, important matter from several sciences, including botany, chemistry, physics, entomology, bacteriology and plant pathology. For the calculations, mathematics would be necessary; for keeping the accounts, bookkeeping would be required; for correct correspondence, there should be training in business English; consideration of transportation, markets and world production would involve knowledge of commercial and agricultural geography.

The project method of instruction on the side of related study, thus, it will be evident, must insure that the boy, in carrying out his projects, shall pass through a thorough-going educational process.

Good Citizenship. — It is proposed, furthermore, that the division of time, in carrying out the school and home farm co-operative method of training, shall be about as follows: for the execution of the projects, including work during vacations and other out-of-school hours, 50 per cent.; and for the related study, 30 per cent. The remaining 20 per cent. of the time of the boy is expected to be used for general culture and good citizenship instruction, wherein systematic courses may be provided in such subjects as English, history, civics, current events, mathematics and science.

Conclusion. — It is believed that the vocational education for farming proposed in this report, and embodying the project and part-time work method outlined in the present chapter, will

justify itself from every reasonable point of view, and that the system of agricultural schools which this report recommends will prove to possess undeniable merit as training schools, both for farming as a definite calling, and for intelligent and vigorous participation in the community life of the Commonwealth.

VI.

THE PROBLEM OF SECURING COMPETENT INSTRUCTORS
FOR A SYSTEM OF AGRICULTURAL SCHOOLS
IN MASSACHUSETTS.

It would seem evident from the preceding discussion of the duties and the opportunities of the instructor in agriculture that he is probably the most important factor in the training of the youth for productive and profitable farming.

Whether he be employed in a separate agricultural school or as an expert in charge of an agricultural department in a regular high school, the special instructor or supervisor in agricultural education should bring to the work certain qualifications as to preparation, experience and personality.

He should be a Graduate of an Agricultural College. — His preparation should include graduation from an agricultural college or its equivalent. He should be familiar with and keep in touch with the officers and the work of the Massachusetts Agricultural College and Experiment Station; and he should keep in touch with the experiment stations in other States where work is being done under conditions similar to those in Massachusetts.

He should be familiar with the work of the United States Department of Agriculture, so far as it is applicable to Massachusetts. He should be capable of keeping in touch with new literature in pamphlet, periodical and book form, as it is issued, and to the extent that it may be applicable to his locality. He should be familiar with the work of organizations concerned with rural progress in Massachusetts, and capable of heartily co-operating with their officers.

His Experience. — Preferably, such a person undertaking to prepare for agricultural teaching in this Commonwealth should have been reared on a Massachusetts farm, or on a farm where the agricultural operations would yield experience of value for work in this State. He should be a master of farming as a handicraft, and amply able to demonstrate the things which he undertook to teach; and he should be familiar with, and

be able to demonstrate the use of, the kinds of farm machinery which can be economically used on a Massachusetts farm.

His Personality. — Since he must teach, such an instructor or supervisor must be effective in discipline; that is to say, in the handling of boys and girls. He must be prepared to meet people in his community pleasantly, and establish agreeable working relations with them. He must be prepared to maintain harmonious relations between his department and the other departments of the school, and be amenable to the authority of the officers responsible for the school which he serves.

The duties of such a teacher of agriculture, attached to either a separate agricultural school or an agricultural department in a regular high school, should in general be those which were indicated in the foregoing discussion of the activities in the field of part-time work in agriculture which he is to direct.

His school year might provide, at the discretion of the school authorities, for service during the spring, summer and fall months, giving him a vacation during the winter months; rather than for service during the fall, winter and spring, with summer months for vacation purposes. Such a program would insure his services throughout the growing and harvesting seasons.

His absence during winter months would not seriously disturb the curriculum of the school; on the contrary, it would make room for the teaching of related subjects, including manual training projects related to the farm, by other members of the staff to the lower classes, and might enable the higher classes to take winter short courses at the Agricultural College. Such a program would enable him to attend winter courses, and thus keep in touch with progress in agricultural science, and become better acquainted with men engaged in research and experimental work.

The appointment and tenure of such a supervisor should be under the control of the local authorities, but subject to the approval of the State Board. Where the supervisor is to serve a separate agricultural school, as at present constituted and administered under the Massachusetts statutes, or an agricultural department in a regular high school, since his salary in either case is to be paid in part by the local community and in part by the State, it would probably be advisable that he should be nom-

inated by the local authorities and approved by the Board of Education; and in case of dismissal for cause, it would probably be best for such a dismissal to be approved by the Board.

Ordinarily, the yearly term of service for such a supervisor should be from the first day of April of any given year to the first day of April of the succeeding year. Dismissal for flagrant offense should, of course, be immediate and without notice.

The salary of such a supervisor is an important consideration. Experience seems to show that, in order to command the services of a man having the technical training, practical experience and personality called for in the above discussion of the necessary qualifications of a successful supervisor, salaries ranging from \$1,000 upwards must be paid.

In Ontario, where salaries for teachers and specialists of every type are on the whole less than in the States, six supervisors, with advisory and teaching duties, were engaged at the beginning of a co-operative scheme between the governmental agencies for agricultural betterment and the local school authorities. These supervisors were paid at the outset, \$1,000 per year.

The Problem of Necessary Salaries is an Economic One at Bottom. — In order to attract to the work a supervisor of the type herein described, it will be necessary to make the compensation which he is to receive as good as, or better than, that which is offered to him in competing lines of work.

By competing lines of work are meant occupations to which his interests, his talents and his preparation might attract him. The following positions at least lie within the possibilities of the desirable graduate of an agricultural college, and therefore constitute competing lines of work: agricultural management work (for others or for himself); agricultural editorial work; agricultural commercial work; agricultural government work; agricultural research work; agricultural extension work; agricultural teaching in colleges; agricultural teaching in high schools; agricultural teaching in agricultural schools; agricultural teaching in departments in regular high schools; assistantships where valuable experience under highly specialized supervision is to be had.

In a very exhaustive study of the preparation and salaries of teachers giving instruction in agriculture in high schools, Mr.

C. H. Robison finds that the prevailing rate of pay received by desirable students in agricultural colleges immediately after graduation is \$1,200.¹

Such a supervisor must at the present time command a salary at least as high as, if not higher than, the average male teacher in ordinary high school work. Graduates of classical colleges are much more abundant and available for teaching in secondary schools than are men qualified to teach agriculture.

*The demands upon the teacher who is to serve as a supervisor of part-time agricultural work are so much more exacting than the demands upon the instructor in old-line training, that men possessing the requisite qualifications of personality and executive ability are at a premium.*²

The salaries now paid to special teachers of agriculture of secondary grade are likewise significant. Mr. Robison presents a table (No. 41) giving the salaries of 33 agriculturists engaging in school work in the past two years. Of these, the first 10 employed as assistants received less than \$850; 23 received \$900 or more; 21 more than \$1,000; and 16 more than \$1,200.

The salaries now commanded by teachers giving special instruction in agriculture in public high schools and other public secondary schools would seem to indicate that the salary of the supervisor described herein must be not less than \$1,000, and must probably be more than that amount per annum, if competent men are to be secured for the work.

¹ In a thesis prepared for a doctor's degree at Columbia University, Mr. Robison gives a list of 179 men graduating from agricultural colleges in the school year 1907-08. This list shows that the salaries of over four-fifths of these men were rather evenly scattered between \$750 and \$1,200. The 24 higher-degree men received an average of \$1,208.33, the prevailing rate being \$1,200. The general average of salaries for the 1907 group was \$947.50, and for the 1908 group \$921.50. The lowest salary received was \$450, and the highest \$1,700.

The significance of the above statistics lies in these three considerations: (1) that the salaries tabulated were commanded practically on graduation day, and hence do not represent the added compensation which efficiency born of experience brings; (2) that the salaries tabulated include, possibly to an extent of more than a majority of the cases, the earnings after graduation of men not capable of acting as supervisors of agricultural training; (3) that the salaries were not confined to men entering educational work.

² The report of the National Educational Association, through its committee on salaries, tenures and pensions of public school teachers in the United States (1905), gives the average annual salary of male teachers other than principals in the secondary schools of Massachusetts outside of Boston as \$1,269; of male teachers and principals, \$1,470; of male principals, \$2,261.

VII.

AGRICULTURAL DEPARTMENTS IN PUBLIC HIGH
SCHOOLS THE PRINCIPAL PRESENT NEED
IN MASSACHUSETTS AGRICUL-
TURAL EDUCATION.

The foregoing chapters of this report have been devoted largely to a description of various features of the work of the separate agricultural school and of the agricultural department in the public high school, as being the two types of training most desirable for a system of agricultural education in this State. It is the purpose of the present chapter to discuss the probable part which each may be made to play in such a system, and the special need of the agricultural department.

To-day in Massachusetts there are three kinds of agricultural education: one for adults; another for children; and a third for pupils of high school age.

Adult Agricultural Education. — Agricultural education suitable for adults was the first to receive attention, and has been most elaborately developed. It now includes public exhibitions, lectures and demonstrations; books, periodicals and papers; field meetings held on farms, movable schools and better-farming trains; correspondence instruction and college courses. Among the most active agents in promoting this work for adults are the State Board of Agriculture and the Massachusetts Agricultural College.

Elementary Agricultural Education. — The place of agriculture in the education of children is discussed in chapter XI., where it is shown that promising beginnings have already been made in teaching elementary school children certain rudiments of agricultural fact and practice. The State normal schools and interested superintendents of schools have been the most active agents in this work. Valuable assistance has been given by the Massachusetts Agricultural College.

Secondary Agricultural Education. — Agricultural education suitable for pupils of high school age is found in three forms:

the private school, of which the Mount Hermon School for Boys, with its elective courses in agriculture, is the most prominent example; the public high school, with some agricultural instruction, of which there are said now to be twelve examples in this State; and the State-aided agricultural school of strictly vocational character, of which there are now two examples, — the Smith's Agricultural School at Northampton, and the Montague Agricultural School at Montague.

The principal present need, it is believed, is legislative provision of State aid for the establishment and maintenance, in existing high schools, of thorough-going vocational departments for the preparation of boys, and perhaps some girls, for Massachusetts farming. In other chapters this report gives evidence that farming in this State offers a good future to those who have been properly trained for engaging in it, and outlines a method for making agricultural education for those above fourteen years of age vocationally effective.

The present law provides State aid for independent agricultural schools. This provision should be continued. But it is believed that this legislation is not adequate for meeting the immediate requirements of the State as a whole.

Only One Rural School has become an Agricultural School. — Under the present law, only one rural school has been reorganized, and converted into an agricultural school, — the school at Montague.

But One School built, and that by Bequest. — Moreover, but one new agricultural school has been established, — the school at Northampton. Without the Oliver Smith bequest, it is perfectly evident, to those who know the situation, that the city of Northampton would not now have that institution.

The school has drawn its students from sixteen towns outside of Northampton, as well as from the city itself. It is in reality a school for a considerable district, rather than for a single city.

In the natural course of events, Northampton, or any other city with a considerable industrial development, would see itself well equipped for industrial training before it would, or perhaps could, give a thought toward the establishment of an

agricultural school for the benefit of its outlying and more or less scattered farming population.

Six Agricultural Schools might be warranted. — There would undoubtedly be ample need of the ultimate establishment in this State of five or six independent agricultural schools.

Districts or Benefactors might build them. — If the burden of establishing such separate agricultural schools is too great to be assumed single-handed by most towns, it is to be hoped that private philanthropy, seeing the need, may be induced to supplement limited public resources.

A group of towns may join in a district and find the undertaking quite within its grasp. In Essex County there is what appears to be a well-developed movement for the immediate establishment of such a school. By degrees the requisite number of separate schools for meeting the needs of the training such schools could so admirably give, may be secured.

The State should help maintain; it should not help construct or equip. — It is plainly the established policy of the State to aid in maintaining industrial and agricultural schools, but not in their construction or equipment. The State must not undertake more than it can carry out; and it is already evident that at no distant date the share of the State in meeting the cost of even one-half of the maintenance charges of vocational education will heavily tax its current resources.

Present Need of Agricultural Departments, therefore, the More Urgent. — Since the demand for vocational agricultural training of secondary grade is pressing, and the establishment of agricultural schools is likely to be long delayed, the need for agricultural departments is seen to be the more urgent.

Fifty Departments for the Cost of Ten Schools. — The cost of establishing a vocational agricultural department in a regular high school would be comparatively slight, — not a tithe of the cost of constructing and equipping an independent agricultural school. Moreover, fully fifty departments could be maintained for about what it would cost to maintain five large, well-equipped and effective agricultural schools. The provision of agricultural departments strongly commends itself, therefore, on the grounds of economy.

Departments would reach the Greatest Number. — An agricultural department close at hand, which permitted the boy to live at home and help with the farm work morning and night and on Saturdays, would be most likely to appeal to parents who were in modest circumstances. Practically all parents, however well-to-do or however needy they may be, are rightly reluctant to have their children leave home at fourteen, or even at sixteen or seventeen years of age.

Many agricultural departments widely distributed through the State would induce the attendance of the largest number of pupils, and thus provide a system of agricultural education suited to the needs of the greatest number of farm homes.

Departments would demonstrate. — Surrounded by farms, vocational agricultural departments in high schools would at once enlist the motor instincts and activities of the boys from these farms in the carrying out, simultaneously with their school instruction and as a vital part of it, of practical farming projects on their own premises.

The best methods would be told and shown. And most boys, as well as most men, in agriculture as in all other productive pursuits, make their best progress by being told and shown, man to man, what to do, and why and when and how to do it.

General Schooling not Enough. — Even in Massachusetts, where the school-going habit has been developed among the people at large to at least as favorable proportions as in most parts of the world, school instruction has had almost no direct bearing on the probable life work of a great number of boys and girls; and to-day, except in very few instances, it yields no practical knowledge or skill to those boys whose severest need is education for efficiency in the work and affairs of modern farming.

Books and Bulletins are not Enough. — How many of the rank and file of busy farmers have had the time, the opportunity or the inclination for learning the alphabet of agricultural science, — that difficult alphabet, in which the most valuable bulletins and treatises on modern agriculture are written? The higher the aspirations of the men of agricultural knowledge, and the more commendable their accomplishments in the conquest of

agricultural science, the more difficult of comprehension do their published works become in the hands of the man hard pressed by the daily affairs of farming.

The need of the hour is the need of the teacher who can simplify language, and tell the boys who are to be farmers in a given town or district the practical bearing of the best research in agriculture on their problems; and who can show the boys, on their own farms and in the laboratory demonstrations at the school, the best methods which are applicable to Massachusetts conditions. It is to meet this need that a system of agricultural departments is proposed in this report.

The Farm is not Enough. — It has been said that "The worst thing about farming in New England is that almost any kind of farmer can get a living on almost any kind of farm." Productive farming — the farming for which additional vocational training is here proposed — is not eking out from the land the nakedest necessities of life. Productive farming is farming for the community, not merely for the individual; it is economic farming, and as such contemplates profit in proportion to the service it renders the community, — in proportion to the quantity and the quality of the commodities put upon the market. Such farming demands the highest operative skill, the keenest scientific insight and the broadest outlook over the wants and the welfare of the community. Many men on Massachusetts farms to-day are doing exactly this kind of productive farming. They have built up their ability through long years of experience. They would be the best possible schoolmasters for their sons in this skillful work, this scientific insight and this breadth of outlook.

But, just as the lawyer who must practice law is generally unwilling to teach it, so the productive farmer, who must meet the pressing demands of economic agricultural operations, and who in most cases must be at once the skilled operative, the scientific observer and the capable business manager, cannot stop to teach his boy the many things he ought to be taught in the years following his fourteenth birthday.

If this is true of the farmer of exceptional ability, it is even more evident among farmers in general throughout the Com-

monwealth. There is no reflection in this observation on the "old stock" or on the immigrant. The statement is put forward as a matter of fact, and shows a condition which has grown, and must continue more and more to grow, out of the exigencies of modern economic agriculture.

If the office alone is not enough as a training school for modern commerce, it becomes increasingly evident that, while the farm must have a necessary part in agricultural education, as is shown in chapters IV. and V. of this report, it is not enough for the training of the prospective productive farmer. The agricultural departments would undertake to render a service to productive farming like that rendered the world of business by the public school department of commerce.

Open Doors of Opportunity. — Mr. D. J. Crosby, specialist in agricultural education of the Office of Experiment Stations, Washington, D. C., has written that he hopes to see secondary agricultural education throughout the country "Open at both ends," — open at the beginning, so that the farm boy can enter; and open at the end, so that those farm boys who desire to go on to higher agricultural training shall be able to do so.

The agricultural departments, as shown in another chapter of this report, would admit any farm boy who had reached his fourteenth birthday, without regard to whether or not he could pass entrance examinations for admission to high school, provided he could demonstrate his ability to profit from the agricultural instruction offered. This would open the door for the boy who might not be "bookish," but who might be capable of making excellent progress in applied science as worked out by the project, or part-time, method proposed in chapter V. of this report.

Fuller opportunity, at the same time, would be afforded the boy who might be both "bookish" and "practical," for advancing in both agricultural and academic training. As stated in chapter V., 20 per cent. of the boy's time would be definitely reserved for broadly cultural education. If a boy who was training for farming valued graduation from an even more strongly cultural course, one that perhaps even included Latin or Greek, and if he were able to cover the ground re-

quired for such graduation without detriment to the vocational training in his agricultural course, he, too, should find wide open before him a door of opportunity commensurate with his ambition and his natural powers.

More and more, agricultural science is bound to be recognized in units of credit for meeting college entrance requirements; certainly for meeting the requirements for admission to colleges of agriculture.

It must be evident, in short, that the agricultural departments in high schools herein proposed would throw open to boys from the farms not limited opportunities only, but opportunities for the most advanced agricultural education of which they might be capable and to which they might aspire. The fact that firm footing for their feet would be found at the outset through the immediate application of their science instruction in their home farm projects, would certainly be no detriment.

Avoidance of Undue Delay. — The establishment of agricultural departments in existing high schools could not be accomplished over night. Their success would depend upon picked men for teachers; and the selection of such men, or their training, would require time and attention. Some time would be required, also, for enabling the local advisory committee in consultation with the State authorities to outline the course of training best suited to meet the needs of the farm boys in any given locality. Certain special agricultural class-room facilities and equipment would require some time for preparation.

But the time necessary for the establishment of such departments would be comparatively brief. In one, two or three years it should be possible to have a reasonable number of such departments actively at work, and reaching most of the farm boys in this State who need this form of agricultural education.

Conclusion. — Chief stress in this chapter has been laid on the need of agricultural departments in existing high schools, and the service they might be expected to render. It is recognized that a new and untried method of instruction is proposed in this report. There have been certain approximations to both the separate agricultural school and the agricultural department

in a high school, as here defined and discussed; but nowhere has there been the definite and studied employment of the project and part-time method of training here contemplated for use in both the agricultural school and the agricultural department.

While, therefore, it is believed that the system of agricultural schools recommended in this report will prove to be an important contribution to the progress of education in this Commonwealth, it is believed, also, that the experimental character of the proposed system, particularly in matters relating to the agricultural department, should be distinctly recognized. To this end, accordingly, the appropriation for aiding such departments has been restricted to \$10,000 a year, — a sum sufficient to start a small number of such departments.

Intense interest in the proposed system exists among farmers, business men and educators throughout the State with whom it has been discussed. Under the supervision of the Board of Education, the work could be subjected to the closest scrutiny, and would be undertaken with corresponding care. Departments need not be established excepting where conditions for their successful development were believed to exist. Every possible assistance could be given those immediately responsible for putting into effect the method here proposed. If the results proved to be disappointing, the appropriation for departments should be discontinued. If the results here anticipated should be realized, the annual appropriation could be increased and the system further extended whenever such action might be considered necessary or desirable.

VIII.

POSSIBLE LOCATIONS FOR AGRICULTURAL SCHOOLS OR DEPARTMENTS.

Where should the schools and departments in a system of agricultural education for Massachusetts be established?

Previously in this report it has been stated that the establishment of five, or possibly six, separate agricultural schools might be warranted in Massachusetts. These might well be located at the most easily accessible points in each of six, readily separable, divisions of the State which furnish the home markets for Massachusetts agricultural products.

That there are six such divisions has been shown by Secretary Ellsworth in his forthcoming pamphlet, entitled "Massachusetts, her Agricultural Resources, Advantages and Opportunities," to which reference has been made in chapter II. His preliminary statement concerning these divisions is as follows:—

The home markets for Massachusetts farm products are confined principally to the 33 cities. These cities, all containing more than 13,000 people, represent almost two-thirds of the total population of the State. The inhabitants thereof are wholly dependent upon the farmer for sustenance. The cities of the State lie in six groups, the locations of which, as previously intimated, were determined largely by the existence of special industrial and commercial facilities.

1. *Desirable Locations for Agricultural Schools.* — If the six agricultural market divisions of the State were to be followed, schools might be located in the divisions described by Secretary Ellsworth, as below shown, and for reasons based on the investigations leading to this report below given.

(1) "*The most western group,*" says Secretary Ellsworth, "is that comprising the cities of Pittsfield and North Adams, having a combined population of 45,000. These markets get all their dairy products and fruits and vegetables in season from producers of northern Berkshire."

Pittsfield promises to be an excellent center, and the time seems opportune for the establishment there of a separate

agricultural school. The formation of an agricultural fair association is under consideration by the Pittsfield Board of Trade, the local Grange and influential citizens. It has been suggested that the two projects might be worked out together. Some of the fair buildings, which otherwise would be unoccupied fully eleven months of the year, might be used for the school. Some of the school equipment and operations might contribute features of very great value for carrying out the educational purposes which the annual fairs would be intended to serve.

Pittsfield is a trade and transportation center for the towns of Lanesborough, Dalton, Lenox, Lee, Cheshire, Berkshire and Hinsdale. This group of towns, with Pittsfield, has a total population estimated at 50,000. The population is said to be increasing at a rapid rate, and to be far outstripping the agricultural development of that section of the State.

(2) "*The second group*," as described by Secretary Ellsworth, "comprises Northampton, Holyoke, Chicopee and Springfield. These cities lie in the lower Connecticut River valley. The last three named are in Hampden County, and are the most populous. The total population is 145,500. This market group draws heavily upon the productivity of the Connecticut valley for 30 miles of its length and from the hills on the east and on the west. The prosperous market gardeners close to the city limits attest to the excellent marketing advantages of this region."

The Connecticut Valley now supplied. — The Smith's Agricultural School and Northampton School of Industries now in operation at Northampton, and previously referred to in this report, is equipped for serving a large area in the Connecticut valley and on the neighboring hills. Students from 16 towns have been enrolled for work in this school, and with but few exceptions have been able to reside at home, — due to the excellence of Northampton as a transportation center.

(3) "*A third group*" is that made up, according to the analysis of Secretary Ellsworth, "of Worcester, Fitchburg and Marlborough. The former is by several thousands the largest city, and no mean percentage of its people are partially self-sustaining. The combined population is 163,500. The supply for these markets comes mostly from the southern and eastern parts of

Worcester County. Railroads enter the cities of this group from twelve different directions direct from the producing sections."

Worcester has been discussed separately in chapter IX. of this report as a most desirable center for an agricultural school. The resources of the city are rich, the agricultural production of its outlying sections is large, the population conditions are adequate, its transportation facilities are excellent, and the enterprise of its local agricultural and horticultural organizations is noteworthy. Few communities could offer conditions more promising for the successful establishment and maintenance of such a school than those which would be found in Worcester.

(4) "*Another group of cities,*" indicated by Secretary Ellsworth, "lie along the Merrimac River in northern Essex County. Lowell, Lawrence, Haverhill and Newburyport make up this group, and afford markets for that section of the State. The railroads are numerous, but do not enter into the movement of produce to these markets to any extent, most of it being drawn over the excellent macadam roads with which this section is admirably supplied. Gloucester, on Cape Ann, is a city of more than 25,000 people, which requires its portion of soil products. It is known best as a port and market for the fishing industry."

In Essex County several locations have been suggested, and it appears that public sentiment has been thoroughly aroused, by the Associated Boards of Trade and other organizations throughout the entire county, in favor of the early establishment of one agricultural school, and ultimately of at least two such schools.

A. *Danvers* has been suggested as a center for such a school. The section about Danvers may be described as pre-eminently devoted to market gardening. The district served might well include Lynn, Marblehead, Salem, Peabody, Beverly and Danvers itself. It is urged that day students living at home could attend school at this center from points as far north as Topsfield, Boxford, North Andover and even Haverhill, more cheaply than they could board, and have margins of time for testing daily at home the teachings of the school.

B. The Merrimac valley, it has been urged, would furnish a desirable center. Agriculture in the Merrimac valley section is rich and varied. It embraces general farming; fruit growing, including peaches and strawberries; and market gardening. The district served might well include Andover, North Andover, Boxford, Georgetown, Groveland, Lawrence, Methuen and Haverhill. Towns even as distant as Danvers, Topsfield, Newburyport and Salisbury would not, it is believed, be too far away for the attendance of day students.

C. Topsfield also has been suggested as a center, owing to the gift of a valuable farm in that town to the Essex Agricultural Society for educational purposes. This farm would offer admirable field facilities for purposes of instruction. The soil, especially in its diversified topographical contours, is typical of the farming land in the immediately surrounding section.

Against this point as a center for an agricultural school has been urged difficulty of access. Topsfield has no electric car service, and is crossed by but a single steam railway line. It might be that an enrollment of day students could not be assured sufficient to warrant its selection as a center.

D. Beverly, or some other spot on the North Shore, has been suggested as a center. It has been urged that an agricultural school might be established and equipped by subscriptions from wealthy residents, and that a district for its maintenance might well be made up of Beverly, Wenham, Hamilton, Essex, Manchester, Gloucester, Rockport and perhaps Ipswich. Such a school, it is urged, should provide instruction in general farming, and should also give particular attention to landscape gardening.

It is said that the North Shore country seats demand much skilled agricultural and horticultural work of all kinds, and that for meeting this demand the establishment and maintenance by the means above named of a somewhat specialized agricultural school would be warranted. There appears to be no little merit in this proposal, and the transportation conveniences would make a school in this locality accessible to a large district.

(5) "*The cities of the fifth group*," as described by Secretary Ellsworth, "are rather widely separated, but, as they are responsible for considerable agricultural activity of a particular sec-

tion, they may be taken as constituting a market for that section. These cities are Brockton in northwestern Plymouth, Taunton, Fall River and New Bedford in Bristol, and Woonsocket, Pawtucket, Central Falls and Providence in the State of Rhode Island. The combined population of these cities in 1905 was 500,000, which was nearly as great as that of Boston.

"This, however, cannot be taken as a true measure of the market for Massachusetts farmers of this section, since the Rhode Island markets get the larger portion of their produce from Rhode Island soil. The Massachusetts cities named above have a population nearly equal to the Rhode Island cities, and, with the exception, perhaps, of Fall River, get all their native food stuffs from Massachusetts farms. Transportation facilities are excellent, no less than thirty lines of railroads entering the cities of the group. Probably most of the garden truck is taken to market over the highways."

The Faunce Demonstration Farm at Sandwich might serve as a nucleus for a separate agricultural school for the Cape Cod section. The real estate of the Faunce Demonstration Farm, when bequeathed in 1909 for its present use, consisted of two houses, a barn, a greenhouse, about 8 acres of cleared land, with 50 acres of woodland adjoining and other woodland at a distance. With this real estate there also was received a fund of about \$20,000. The whole property was left as a memorial to Dr. Robert H. Faunce, who had died suddenly the year before, by his mother, in the hands of four of her personal friends as trustees, with wide discretionary powers, but with her wish well understood that the estate was to be used to encourage Cape Cod agriculture. Demonstration work in fruit and vegetable growing and in poultry farming has been energetically undertaken. This establishment was described very fully by the "Boston Herald" of Nov. 27, 1910, in an illustrated article, entitled "The Farm without Frills."

The conditions at Sandwich are so closely typical of the Cape as a whole, and transportation facilities are such, that Sandwich naturally suggests itself as a desirable center for an agricultural school. Agricultural production in that section has been sorely neglected, products which might well be grown at home being brought in for supplying local needs from the Boston markets.

The importance of Sandwich as a center is expected to be greatly enhanced by the completion of the new Cape Cod Canal.

The people of the community, particularly the school boys, have responded to the influence of the Faunce Demonstration Farm. The superintendent of the farm, as this report is being written, is instructing special classes of high school students who are desirous of the training this farm and its manager are prepared to provide.

(6) "*The sixth group*," discussion of which Secretary Ellsworth deferred until the last, because of its magnitude, is that which, he says, "for present purposes may be called the Boston market. Fifteen cities and about as many large towns may be included in this group. It has its center at Faneuil Hall, and radiates for 10 miles north, south and west. Within the circumference of this territory there dwell more than one-third of all the people in the Commonwealth. Well may Boston be termed 'the Hub;' it is truly the center of this enormous market."

The Suburbs of Boston. — It is well known that the greenhouse and market-garden interests in the vicinity of Boston have reached enormous development, and it has been suggested that a special school for training producers of market-garden and greenhouse crops might well be established in one of the suburbs of this city.

Such a school might materially differ in its course of study from the other agricultural schools, and form a very important part of a system of agricultural education for the State. Students who desired to specialize in these branches of agricultural production might, at the end of the first two or three years in any of the other agricultural schools or agricultural departments, possible locations for which are hereafter discussed, be transferred to this school for a one-year or two-years finishing course; that is to say, such a school might well be organized for providing a short course of highly specialized instruction for boys of sixteen or more years of age.

2. *Possible Locations for Agricultural Departments in Existing High Schools.* — Local conditions should be strong factors in determining whether or not the establishment of an agricultural department would be advisable at any given point.

There is throughout the State a very general excellence of

transportation facilities. When, for example, possible locations for the proposed Massachusetts College centers were being selected, it was found that 30 such centers could be so placed that 92 per cent. of the school population of the State would live within the range of a five-cent fare by steam or trolley from these centers, and that six per cent. more would live within the range of a ten-cent fare. Transportation facilities are likely to be found favorable at most points which might be suggested.

In choosing locations for agricultural departments in high schools, some account should undoubtedly be taken of the tendency of agriculture to develop more strongly with reference to local market demands than with reference to any local peculiarities of soil or traditional production, — a tendency which has been referred to by Secretary Ellsworth. Strong or distinctive home-market centers for agricultural products might well, as in the cases of the agricultural schools, furnish the most desirable locations for agricultural departments.

Following are centers — but not always market centers — which have been suggested as likely to be found desirable for the location of vocational agricultural departments in existing high schools: —

(1) *Great Barrington* might be found desirable as a center, so far as the farming interests and transportation facilities are concerned. Farmers conversant with Great Barrington conditions have estimated that an annual enrollment of 20 farm boys could be assured, if such a department should be established, with an ultimate enrollment of probably not fewer than 50. The surrounding towns have no manufacturing, but contain many estates of summer residents and many typical western Massachusetts farms. These towns now send a number of tuition students to the Great Barrington high school.

An agricultural department at this center might be found very serviceable, therefore, to a considerable surrounding territory, as well as to Great Barrington itself. Instances are given of students, living at home, but attending school in Pittsfield from points as far south as Stockbridge. The distance from Stockbridge to Pittsfield is of course much greater than the distance from Stockbridge to Great Barrington. It has been

urged that, with an agricultural school at Pittsfield and an agricultural department at Great Barrington, the Berkshire section of the State would be well supplied with means for the agricultural education of boys fourteen or more years of age.

(2) *West Springfield* has been suggested as a favorable spot for a strong agricultural department course in market gardening as well as in general agriculture. There would be abundance of illustrative work going on within easy reach, and the transportation facilities for day students would be all that could be desired.

(3) *Palmer* might be another desirable center. This is a town of about 8,000 inhabitants, and is made up of several villages. It is an important transportation center, being intersected by several steam railway lines and served by numerous electric car lines radiating from Palmer village as a center. A large farming area might thus be readily accommodated.

Across the river from the village is a very large State institution, with extensive farms and varied farming operations. Much help is there employed, and practical work might there be had by boys from village homes who desired to be trained for farm life and work. The superintendent of this institution has expressed great interest in the possible establishment of an agricultural department in the Palmer high school, and might be relied upon to do everything possible for enhancing the value of its practical instruction.

Palmer has three outlying manufacturing villages, in each of which the mill property includes farming land. The agents of the mills have expressed considerable interest in the possibility of an agricultural department in the Palmer high school. One of them would contribute forestry demonstration work; the others would render any assistance which might be found practicable.

(4) *Sandwich*, if the Faunce Demonstration Farm were not developed into a separate agricultural school, would be admirably suited for an agricultural department. The farm would provide excellent means for demonstration and practice work at the school, since the farm is but a few steps from the high school building.

(5) *Kingston* would be another favorable point. Though Kingston itself might not assure an enrollment sufficient to warrant the establishment of such a department at the local high school, the transportation facilities are such that a department located at Kingston might serve a considerable territory, including the towns of Plymouth, Carver, Plympton, Halifax, Silver Lake and Duxbury.

Kingston no doubt has been suggested owing to the keen local interest in agricultural improvement which has already been aroused. There is a model farm operated by a private owner in the vicinity of the high school, which would afford proper demonstration facilities.

(6) *Byfield* has been suggested as a good center for an agricultural department. Dummer Academy is located in this town, and owns a farm fairly typical of the land in this section. It has been suggested that the town authorities, acting with the officers of Dummer Academy, might utilize the academy farm and a portion of the academy buildings for the establishment of such a department. Byfield has electric car service as well as steam, and day students from Newbury, Georgetown, Rowley and Ipswich might there be accommodated.

(7) *Walpole* is another location which has been suggested for a department. Three very interesting farms, one a purely investment proposition, one where clean milk is produced under exceptionally good conditions, and another where an undertaking is under way for developing a farm which shall grow all its own grain as well as roughage, would afford very unusual illustrative facilities, not too far distant. Walpole has both steam and electric railway service, and a department in the Walpole high school might well serve a considerable surrounding section.

(8) *Petersham* is another center which has been suggested. A central school building, costing \$75,000, has been given to the town. In this are accommodated all of the grades of the local schools, including the high school. In order that agricultural instruction might be given, a small greenhouse was erected and a small tract of land for out-door work was provided. The school has already taken for its name the "Petersham Agricultural High School."

3. *Procedure for choosing Locations for Vocational Agricultural Schools.* — Other desirable locations for both agricultural schools and agricultural departments will undoubtedly be brought to view. The lists above given simply make record of those possible centers which have most readily singled themselves out, owing to certain obvious, and, as a rule, peculiarly advantageous, local conditions.

No serious work could be expected of any community in the direction of a definite canvass of its specific requirements and possibilities, in the absence of legislation fixing the general policy of the State as to the desirability of establishing a system of agricultural schools throughout the Commonwealth. Such legislation might be expected to follow the submission of this report. For those conducting the preliminary investigations leading to this report to have urged such canvasses would have been to enter the field of propaganda, — a field construed to be foreign to the present purpose.

In the event of favorable action by the Legislature on the establishment of the system of vocational agricultural schools recommended in this report, the procedure for choosing a location for a school or a department would probably be somewhat as follows: —

(1) A local committee interested in the subject might petition the Board of Education for a conference. Such a committee might be the regular school committee, acting through the superintendent of schools; or it might be a group of interested citizens, such as members of a grange or of a board of trade.

(2) The conference might be expected to result (*a*) in a careful canvass of the local farming conditions and the local market demands for agricultural products; and (*b*) in the tentative formulation of a course of training which appeared to be suited to the farming needs of the particular locality.

(3) It might then be advisable that a careful census of the local school population should be made, for the purpose of estimating the number of boys just approaching the fourteenth birthday or just past it, who would enroll in a school which should provide such a course of training as that tentatively formulated.

(4) With the list of prospective students in hand, the next

step would probably be to secure assurance from the parents of those students of willingness to co-operate heartily with the school in carrying out the programme of part-time work, which is believed to be essential to the proper conduct of the proposed type of agricultural education.

(5) Assured of the necessary home farm co-operation, and an adequate enrollment, the next natural steps would be: (*a*) consideration of suitable land, buildings and equipment, and their probable cost; (*b*) the availability of suitable teachers, and their probable cost; and (*c*) the probable cost of maintenance, other than the expense for officers of instruction and administration.

If a department in a high school were contemplated, the above problems of (*a*) suitable quarters and equipment, (*b*) instruction and (*c*) miscellaneous necessary maintenance cost would be much simplified. The attitude of the local high school officers and teachers would previously have been ascertained when the proposed course of training was formulated.

(6) With all the needs definitely known, ways and means of providing funds and election or appointment of official local authorities for the establishment of the school, or department, would be the next natural objects of attention.

A. Action might be speedy and the problems simple, if the town or city were to provide the school for itself.

B. Action might be slow and the problems more difficult, if the school were to be provided by a district of several cities or towns, or cities and towns.

C. All would most readily be accomplished, if a private donor, or group of donors, should provide the necessary plant. The Oliver Smith fund of \$310,000 was a great aid in establishing the agricultural school at Northampton; as was the Faunce bequest in establishing the Faunce Demonstration Farm at Sandwich, and the resultant agricultural instruction during part of the year now given high school students in that town.

In addition to the suggested North Shore school which it is thought might be built and equipped by private donors, it is understood that another project, somewhat of the Sandwich type, is likely to be provided for at an early date by private gift.

Few benefactions are likely to be more permanently useful than modest gifts and bequests of the Faunce type, which would provide desirable school equipment at many points for the more practical elements of the agricultural education of the boys and girls who expect to live their lives and do their work on Massachusetts farms. If large discretionary powers were lodged with the trustees, local school authorities or the Board of Education, every interest of future progress would be served, as well as the obvious present need, by such benefactions.

(7) Finally, it may be said that, since the schools proposed would receive State aid for their maintenance, subject to approval by the Board of Education, the Commissioner of Education and those representing him might be expected to render, at all stages of the proceedings, every possible assistance to any local community which desired to establish the types of agricultural education proposed by this report.

IX.

RECOMMENDATION WITH REGARD TO AGRICULTURAL
EDUCATION FOR WORCESTER.

In accordance with the provisions of chapter 108 of the Resolves of 1910, the investigation leading to this report considered the "practicability and desirability of establishing a farm school in the city of Worcester in which instruction may be given, free, in the raising of fruits, vegetables, flowers, grains, plants and trees, and in the care of domestic animals, and in which similar instruction suitable to their years may be given to children."

It will be remembered that the 1905 Massachusetts State census showed that the agricultural produce of Worcester County was reported as \$14,279,000, and of the city of Worcester alone as \$1,491,000. While the second city in population, Worcester ranked first of the cities and towns in the value of its agricultural products.

The farm products of Worcester are widely varied and are readily marketed. The long slopes which characterize the outlying land are found to be remarkably favorable for fruit, particularly for apple growing; dairy and poultry products hold a strong position; market gardening is highly promising.

Worcester has two important and very active organizations in its agricultural and horticultural societies. The city has made a most commendable beginning in trade school work, and the rounding out of its system of vocational training of secondary grade might well take the form of a strong separate agricultural school. The resources of the city and the importance of its farming interests would fully warrant the establishment and maintenance of such a school.

It is believed that the provisions proposed in this report for meeting the needs of the State at large for a system of vocational agricultural education of secondary grade would meet the requirements of Worcester, and that, therefore, special legislation for this particular city should not be herein proposed.

X.

AGRICULTURE AS A PHASE OF LIBERAL EDUCATION IN
THE HIGH SCHOOLS OF MASSACHUSETTS.

It is appropriate that something should be said in this report with respect to the study of agriculture as a part of the program of the so-called liberal education, to which our school system has been for the most part devoted.

There is an active movement in secondary education looking to more effective organization of subject matter and method for the purposes of liberal or cultural education. In this movement it is natural that many persons should look upon agriculture as a promising and attractive field of secondary school study, especially for rural high schools. For this purpose it presents several aspects.

1. *Agricultural Lands and People.*—In the economic life of all the centuries, agriculture has played an important part. The control of the fertile lands in the great valleys and plains has made and unmade nations. Political organization has in all times been greatly affected by the ownership of land and by the kind of agriculture practiced.

In our own century territorial division of labor plays an important part, with the result that one kind of farm industry monopolizes the lower half of the Mississippi valley; another, the warm valleys of California; another, eastern Asia and still another, the plains of Canada.

To the student of the play of social forces, the distribution of population along agricultural lines is a fascinating theme. One can read with intense interest of the effects of occupations on the social life of the peoples of the prairies and the tropics, of the inhabitants of the great steppes of Russia and of the small cultivators of France and Italy.

2. *Agricultural Science and Invention.*—Especially interesting as themes for study are the transitions which the nineteenth and twentieth centuries have brought into agriculture. The inventions of science and the evolution of machinery, substituting animal strength and natural forces for human brawn

and sinew, have increased agricultural production, have extended human prosperity, and have made the farm a field wherein scientific knowledge finds abundant application.

Many a scientist has, within the last half-century, enriched humanity by his contributions to effective farm production. The work of our own national government in agricultural research and in spreading a knowledge of approved methods constitutes a most cheering sign of governmental activity.

It is evident that, along these and allied lines, it is possible to build up a field of study which as a part of liberal education would easily rank with certain subjects now taught with great effort in the public high schools of rural communities.

3. *Science Laboratory Illustrations from Agriculture.*—Agriculture must increasingly be considered as a field of applied science. Physical and commercial geography, botany, zoölogy, bacteriology, physiology, chemistry, economics, have numerous important applications in agriculture, and many of these applications are so concrete and simple as to constitute excellent laboratory illustrations.

It is not strange that seekers for more satisfactory methods of teaching science should turn preferably to agriculture for suggestion and material. It has become more and more evident that science cannot be very effectively taught to secondary students strictly in its "pure" form. Children of the adolescent stage of development apparently respond more satisfactorily to that science teaching which begins with applications and concrete cases, and then merges into generalizations, principles and laws. We know that this is the historic order in the evolution of scientific knowledge, and it is not improbable that in the main the pedagogic order must follow the historic order.

In the high school attempts are being made in many places to organize general science for first or second year instruction. This course consists in some instances merely of topics selected from various sciences; in others it is based on subjects, like physical geography, which involve principles and applications from many sciences.

A more satisfactory procedure, in the view of many educators, will be to take the subject of agriculture, abounding in direct

and practical applications from many scientific fields, and to organize a course of instruction in which the pupil will advance from concrete experience to an appreciation of underlying scientific principles, and also at every step become cognizant of the real significance of the subject in promoting personal and social well-being. An able presentation of secondary school science of this kind recently appeared from the United States Department of Agriculture (Experiment Station Record, September, 1910).

The unsatisfactory results not infrequently obtained from the study of abstract mathematics and formalized physics seem to justify the belief that agriculture can be used to advantage as a means of approach to science, in a scheme for liberal education in secondary schools.

4. *Agriculture and Wholesome Living.* — The conception of modern liberal education involves to an increasing extent a study of social conditions and of the factors that make for wholesome personal and community living.

We are in the midst of a reaction against the movement to the city, and students of social economy are becoming more and more convinced that the development of sound citizenship, as well as of sound physique, as a nation, is dependent on a large agricultural population.

The study of agriculture as a field of human activity involves constant reference to the social characteristics of rural communities, and to the means for the better development of desirable pursuits. One important question relates to the bearing on physical health of rural life and its occupations.

5. *Agriculture and the Educational Values of Concrete Experience.* — Modern education is developing a wider and better psychological outlook. Education in the past has been identified with instruction given in schools; and school training has, owing to the force of circumstances, been an education by means of books and writing, modified in recent years by more or less laboratory experience. Modern pedagogy, on the other hand, maintains that academic teaching can be effective only as it builds on a basis of concrete experience, obtained by a thorough contact with the realities of life.

Before the development of modern cities and the resulting industrial conditions, a large majority of growing boys and girls had abundant opportunity to share in productive occupations, to participate in the natural sports of childhood and to acquire industrial experience, simply through contact with their environment. It seems to be biologically true that this basal experience is necessary, as antecedent to the form of education we call academic.

6. *Some Agriculture almost Indispensable to Sound Education.* — Manual training and laboratory work in science have been undertaken partly as a means to realize this experience. Both are necessarily made artificial by the cramped conditions under which they must be conducted. Agriculture offers a peculiar opportunity for a more extended and satisfying field, wherein this basal experience may be acquired.

It must be noted that this argument has no reference to vocational training. In fact, it might be urged from the standpoint of liberal education that persons destined for the professions and learned callings stand in greatest need in their earlier years of broad experience with the soil, with domestic animals and with the conditions of production in nature. In many communities a certain number of hours per week devoted to agricultural production, whether in school gardening or in the more complex farming activities, may easily be regarded as an almost indispensable part of a liberal education, when one takes into account the conditions involved in modern life.

7. *Agricultural Text-books for Reading Courses.* — The above considerations serve to define to some extent the part which agriculture may play in a system of liberal education.

In hundreds of high schools of the United States descriptive courses in agriculture are now offered. They are based on many excellent text-books which have appeared, and the instruction often consists mainly in guiding the reading of the pupils. If the teacher himself be interested in the larger economic and scientific aspects of modern agriculture, as well as in its historic evolution, he can make the subject one of intense interest, even without laboratory demonstration or field experience.

Much of our high school education must still be obtained from text-books, and the work described above offers surely as attrac-

tive a subject of study as ancient history, text-book science as sometimes still taught, or mathematics.

8. *Agricultural Manuals for Science Laboratories.* — Many schools are ambitious to go farther, and in a somewhat different direction. They prefer not to treat agriculture in its broad geographical or historic aspects, but to use it as a means of introducing some notions of science.

Here, again, many excellent books and manuals are available, and the opportunities for laboratory illustration may be easily supplied. In fact, a most valuable line of experimentation may be followed with the scantiest of materials and equipment, such as a farmer might often possess. The skilled and enthusiastic teacher is able in this way to make agriculture not only a means of general culture, but a most valuable means of approach to the more abstract sciences.

9. *Agriculture and Enlarged Educational Opportunity.* — A few schools have gone farther still. They have, by individual or joint effort, carried out certain productive enterprises on land in their possession. They have engaged in gardening, and in some instances have performed experiments with certain forms of live stock. The work has been made the center of correlation for manual training, commercial arithmetic and science. The social significance of co-operative effort has been revealed, and a new spirit with reference to country life evoked.

This work, while not confessedly industrial, does serve a valuable vocational purpose, in that it gives something of the ideal and outlook which ultimately constitute a large element in vocational success. But the contributions to liberal education of the schools in which this form of work has been developed are unmistakable. The widening horizon of the pupil, his greater sympathy with the prosaic occupations of life, and his growing appreciation of the possibilities of art and science applied in every-day callings, tend at every step to render him a person of power and to add to his possibilities of growth.

There are educators who believe that such a reorganization of the program of liberal education, as here described, whereby special studies and practices shall lead into larger local, industrial and social activities, constitutes the greatest opportunity

of the future for our schools. Agriculture, as the occupation of half the American population and an important portion of the people of Massachusetts, is an especially inviting field.

10. *Motives of Liberal Education now Dominant.* — The above types of agricultural education are all controlled by the motives dominant in liberal education. It is not intended that they shall be determined by the conditions and necessities of vocational education. It is desirable that, when the ends of liberal education are being sought, only incidental consideration should be given to the industrial significance of the means employed. Nevertheless, it must be apparent that all the above methods of instruction, even when based solely on the textbook, have some influence on vocational skill.

Success in one's calling depends on something more than skill, and capacity to apply science and art to productive ends; it involves social outlook, wider sympathies and the ideals which actuate life. While the above forms of education cannot be called vocational, they nevertheless should contribute ideals and appreciation, — important elements in the success of those youths who ultimately turn to agriculture as an occupation.

The study of agriculture above described should, so far as State encouragement and support are concerned, stand in the same position as the study of foreign languages, history, mathematics, science and all subjects traditionally associated with liberal education. It should not be aided by the State, as though it were part of a system of vocational education.

XI.

AGRICULTURE AS A PHASE OF LIBERAL EDUCATION IN
THE ELEMENTARY SCHOOLS OF MASSACHUSETTS.¹

PART I.

The Present Status.

While there is as yet no systematic or general recognition of agriculture in the program of the elementary public schools of the State, enough has been done in teaching this subject to show that, within the limits of the capacity of the children, such instruction is entirely practicable, and that the results justify an extension of this kind of work. Even in one-room rural schools, as at Hinsdale and Peru, teachers guided and directed by capable and skillful supervision have overcome apparent limitations, and have given boys ranging from twelve to fourteen years of age a knowledge of the best methods and actual practice in the raising of certain staple vegetables. An example of one of the projects that has been found most feasible and satisfactory is given as Part II. of this chapter.

Some Definite Results.

The instruction in agriculture in the elementary schools has led to a general use of the leaflets and bulletins issued by the United States Department of Agriculture, by the State Board of Agriculture and by the Massachusetts Agricultural College. Not only do the boys in connection with their school projects read with interest and appreciation these bulletins, but the school becomes a medium through which such information on the best methods of culture is brought into the community itself. Farmers have thus become acquainted with approved methods of cultivating certain crops, and use such information in their own practice. One community, for example, has learned the value of the formalin treatment for scab in potatoes, the best and cheapest combinations for ferti-

¹ Prepared by Deputy Commissioner Orr.

lizers, and the use of the Bordeaux mixture for the prevention of potato blight.

Besides these economic results, an increased interest in and appreciation of the school have been developed among the people. It has been possible to introduce in such rural schools other practical projects in dressmaking and cooking, in which undertakings the girls of the upper grammar grades have shown efficiency and ability. In these and other ways helpful relations have been established between the school, and the arts of the farm and home. In the schools where such exercises have been introduced with success, it has been found that the boys acquire added interest in school work along all lines. The direct use made of penmanship, arithmetic, composition, bookkeeping, drawing and manual training has resulted in an improved quality of work in those branches.

The Value of Elementary Agriculture.

Instruction in elementary agriculture in the upper grammar grades has a direct value in itself, because it contributes to the prosperity of the farming community by aiding in the introduction of improved methods.

Teachers, by means of such courses, have been able to increase the interest among their pupils in the work and the activities of the farm. One may hope that, through such influences, boys may be induced to remain in the country districts; but sufficient data are not as yet at hand to demonstrate that elementary agriculture in the schools accomplishes such a result. It will be agreed that it is highly desirable to make use of all possible means to check the present excessive tendency toward the city.

The work in agriculture in a rural school opens up a way for helpful co-operation between the school on the one hand, and the home and the farm on the other. One of the best opportunities for applying the teaching of the school is when a boy secures a plot of land in the home garden or farm, and cultivates it according to the best methods. Such an undertaking should be carried out as a business enterprise, an account kept of receipts and expenditures, and a statement made at the close of the season which shall show the balance of profit or loss.

Courses in elementary agriculture furnish a preparation for the direct vocational work in schools of higher grade. Pupils who have carried out one or more garden enterprises have acquired some knowledge of elementary methods in farming, and some information regarding the vegetable raised, soil, weather conditions, effects of fertilizer, heat, light and moisture. They thus come to the more advanced work with a large body of experience, which the secondary school teacher may utilize to advantage.

Agencies to Promote Elementary Agriculture.

1. *Nature Study.* — In the early years of the school life of the pupil he is led to observe plant and animal life, and gains a considerable body of experience relating to the phenomena of weather, soils and local natural history. When elementary instruction in agriculture has been thoroughly established and systematized, it will be possible to direct and shape nature study so as to give it more definite aims and purposes than at present, and at the same time to retain the quality in that study which makes for appreciation and enjoyment of nature.

2. *School Gardens.* — The school garden is winning a place in the public schools of the State. Through the undertakings involved in gardening, the pupil gains experience, knowledge and skill in certain processes connected with farming. It is desirable that the school-garden work should be so directed as to give the pupil a definite task, in accomplishing which he must overcome real difficulties in the soil, learn to protect his crop against insect pests and against untoward weather conditions, and finally secure a tangible and measurable product. The school garden may thus closely approximate actual farming conditions. The normal schools of the State, particularly at North Adams and Hyannis, are giving serious attention to school gardening of this character. Use is being made in this activity of the motives that underlie social and collective action, while opportunity is afforded for wholesome rivalry and for desire for individual excellence.

3. *Potato and Corn Clubs.* — Under the auspices of the Massachusetts Agricultural College, a large number of boys in different parts of the State have been organized into societies for

raising certain staples in accordance with the best scientific methods. Under the leadership and direction of members of the faculty of the Massachusetts Agricultural College, a widespread interest in agriculture has been developed. Seed of approved quality is distributed to the members of these clubs, and full directions are given regarding culture and harvesting. Exhibits are held at the close of the season under the auspices of local granges or other organizations. Prizes are awarded for the best results.* By these means the boys are stimulated, by emulation and friendly rivalry, to put both skill and industry into their individual undertakings. Some notable results have been secured through this movement, in the culture of both corn and potatoes.

4. *Summer Courses.* — The Massachusetts Agricultural College, by its summer courses for the training of teachers, by its conferences on rural conditions and by the travelling school of instruction, in which use is made of the train and trolley service of the State, is doing valuable work in stimulating an interest in farming and in spreading a knowledge of scientific method among teachers.

5. *The Work of the Board of Education.* — An agent of the Board of Education is giving a large part of his time and attention to the encouragement and direction of teachers and superintendents in the establishment and conduct of elementary work in agriculture. Under his direction a manual is being prepared which gives directions for carrying out a number of projects in agriculture. This publication furnishes detailed and specific instructions, whereby superintendents and teachers will be enabled to conduct classes in the different projects intelligently and effectively. In Part II. of this chapter a brief description of this manual, and an example of one of the projects are given.

Provisions for Extension and Development.

In order that elementary agriculture in the grammar grades may be carried on with success, it is necessary that teachers should receive some training for the work. Such preparation may be given in several ways. The manual to which reference has already been made should enable an alert, progressive teacher,

when guided by her superintendent, to carry out with success certain undertakings in agriculture. The normal schools and the summer school at the Massachusetts Agricultural College are already rendering service by training their students for the work which falls to a teacher in a rural school, and are in some instances giving direct instruction in the processes of farming. It is important that superintendents who are in charge of schools in the country should inform themselves on elementary agriculture. Guidance and help from the superintendent are important factors in promoting the efficiency of a teacher in this field of instruction. It has been suggested that the Board of Education might well consider the question of securing a grant of money from which payments might be made to the smaller towns in order that the salaries of teachers who are making a success of the work in agriculture and in other practical branches might be increased. Such an incentive would encourage capable young women to enter the service of the rural schools, and to continue in this field of work for a time. It has been shown by experience that such teachers with a capacity for leadership, not only improve the quality of the school work, but also exercise a most helpful influence upon the community life, this influence being shown in the betterment of economic and social conditions.

PART II.

Introduction.

An agent of the Board of Education is preparing a manual for the instruction of teachers in the work of elementary agriculture. This bulletin is entitled "Some Agricultural Projects for Elementary Schools." The nature of the work is best shown by a brief description of each of the four parts, and by an example of one of the projects.

The Divisions of the Manual.

Part I. The Projects. -- This portion of the bulletin gives full and specific directions, whereby the children in the elementary schools, under the direction of teachers, may successfully raise such vegetables as potatoes, tomatoes, parsnips, lettuce,

alfalfa and radishes. In all, fourteen such undertakings are described.

Part II. Suggestions for Garden Work. — One finds here full directions as to how the work in gardening can be conducted to best advantage in an elementary school. The place of such work in the program is described, and a statement is added of the necessary equipment in land, tools, measures, seeds, fertilizers and reference and study books.

Part III. Laboratory Work. — This section contains detailed descriptions of twelve experiments relating to plants and soil.

Part IV. Collateral Work. — Instruction is given as to the ways in which pupils may be given practice in the writing of letters, in the keeping of diaries, in applying arithmetic, drawing and manual training and in the use of business forms in connection with the work of elementary agriculture. Suggestions are made on the use of material, afforded by elementary agriculture, as a basis for composition exercises. Possible correlation with the work in geography and in science is also indicated.

The manual on agriculture projects should do much in promoting the practical work in the upper grammar grades, because it puts at the command of teachers and superintendents a body of exercises that have been carefully prepared for use under usual school conditions.

First Project. — Potato.

A brief summary of this project is given as an illustration of the method of treatment used in the manual.

Preparation of the Soil. — Advice is given on the kinds of soil adapted for potato culture. The proper time for plowing and the methods to be used in preparing the soil, by harrowing and furrowing, are also discussed. Several kinds of fertilizers are described. The manual points out ways whereby fertilizers may be obtained at smallest expense and applied in the field to best advantage.

Seed, Selection and Preparation. — The standard varieties of seed and the qualities desired in potatoes used for planting

are described. Other topics are: the use of the formalin solution to prevent scab, the need of care in sprouting, and the best ways of planting.

Cultivation. — Under this head instruction is given on hoeing and hilling. The use of Paris green to destroy the potato bug and spraying with the Bordeaux mixture to prevent blight are treated.

Harvesting. — The manual tells the learner when and how a crop is harvested. A plan for estimating the number of potatoes yielded by the field and a form for a report on the number of potatoes in each hill are given. A list of books dealing with potato culture is presented.

APPENDIX.

The Commonwealth of Massachusetts

In the Year One Thousand Nine Hundred and Eleven.

AN ACT TO CODIFY AND AMEND LEGISLATION RELATING TO STATE-AIDED
VOCATIONAL EDUCATION.

Be it enacted, etc., as follows:

CONSTRUCTION.

1 SECTION 1. The following words and phrases as hereinafter used
2 in this act shall, unless a different meaning is plainly required by
3 the context, have the following meanings:—

1 1. "Vocational education" shall mean any education whose con-
5 trolling purpose is to fit for profitable employment.

6 2. "Industrial education" shall mean that form of vocational edu-
7 cation which fits for the trades, crafts and manufacturing pursuits,
8 including the occupations of girls and women carried on in work-
9 shops.

10 3. "Agricultural education" shall mean that form of vocational
11 education which fits for the occupations connected with the tillage
12 of the soil, the care of domestic animals, forestry and other wage-
13 earning or productive work on the farm.

14 4. "Household arts" education shall mean that form of voca-
15 tional education which fits for occupations connected with the
16 household.

17 5. "Independent industrial, agricultural or household arts school"
18 shall mean an organization of courses, pupils and teachers, under a
19 distinctive management approved by the board of education, de-
20 signed to give either industrial, agricultural or household arts edu-
21 cation as herein defined.

22 6. "Evening class" in an industrial, agricultural or household arts
23 school shall mean a class giving such training as can be taken by
24 persons already employed during the working day, and which, in
25 order to be called vocational, must in its instruction deal with the
26 subject matter of the day employment, and be so carried on as
27 to relate to the day employment.

28 7. "Part-time (or continuation) class" in an industrial, agricul-
29 tural or household arts school shall mean a vocational class for per-
30 sons giving a portion of their working time to profitable employment,
31 and receiving in the part-time school, instruction complementary to
32 the practical work which is being carried on in such employment.

33 To give "a portion of their working time" such persons must give
 34 a portion of each day, week or longer period to such part-time class
 35 during the period in which it is in session.

36 8. "Independent agricultural school" shall mean either an organi-
 37 zation of courses, pupils and teachers, under a distinctive manage-
 38 ment designed to give agricultural education, as hereinafter pro-
 39 vided for, or a separate agricultural department, offering in a high
 40 school, as elective work, training in the principles and practice of
 41 agriculture of an extent and character approved by the board of
 42 education as vocational.

43 9. "Independent household arts school" shall mean a vocational
 44 school designed to develop on a vocational basis the capacity for
 45 household work, such as the callings of cookery, household service
 46 and other occupations in the household.

STATE ADMINISTRATION AND SUPERVISION.

1 SECTION 2. The board of education shall be charged with the duty
 2 and given all necessary power to investigate and to aid in the intro-
 3 duction of industrial, agricultural and household arts education; to
 4 initiate and superintend the establishment and maintenance of
 5 schools for the aforesaid forms of education; and to supervise and
 6 approve such schools, as hereinafter provided. The board of edu-
 7 cation shall make a report annually to the legislature, describing
 8 the condition and progress of industrial, agricultural and household
 9 arts education during the year, and making such recommendations
 10 as such board may deem advisable.

TYPES OF SCHOOLS.

1 SECTION 3. In order that instruction in the principles and the
 2 practice of the arts may go on together, independent industrial,
 3 agricultural and household arts schools may offer instruction in day,
 4 part-time and evening classes. Attendance upon such day or part-
 5 time classes shall be restricted to those over fourteen and under
 6 twenty-five years of age; and upon such evening classes, to those
 7 over seventeen years of age.

LOCAL ADMINISTRATION AND CONTROL.

1 SECTION 4. Any city or town may, through its school committee
 2 or through a board of trustees elected by the city or town to serve
 3 for a period of not to exceed five years, to be known as the local
 4 board of trustees for vocational education, establish and maintain
 5 independent industrial, agricultural and household arts schools.

1 SECTION 5. 1. Districts composed of cities or towns, or cities and
 2 towns, may, through a board of trustees to be known as the district

3 board of trustees for vocational education, establish and maintain
4 independent industrial, agricultural or household arts schools. Such
5 district board of trustees may consist of the chairman and two other
6 members of the school committee of each of such cities and towns,
7 to be appointed for the purpose by each of the respective school com-
8 mittees thereof; or any such city or town may elect three resi-
9 dents thereof to serve as its representatives on such district board
10 of trustees.

11 2. Such a district board of trustees for vocational education may
12 adopt for a period of one year or more a plan of organization,
13 administration and support for such schools. Such a plan, if ap-
14 proved by the board of education, shall constitute a binding contract
15 between the cities or towns which are, through the action of their
16 respective representatives on such a district board of trustees, made
17 parties thereto, and shall not be altered or annulled except by vote
18 of two-thirds of the entire district board of trustees and the consent
19 of the board of education to such alteration or annulment.

1 SECTION 6. Local and district boards of trustees for vocational
2 education, administering approved industrial, agricultural or house-
3 hold arts schools, shall, under a scheme to be approved by the board
4 of education, appoint an advisory committee composed of members
5 representing local trades, industries and occupations. It shall be the
6 duty of such advisory committees to counsel with and advise such
7 local or district boards of trustees and other school officials having
8 the management and supervision of such schools.

NON-RESIDENT PUPILS.

1 SECTION 7. 1. Any resident of any city or town in Massachusetts
2 which does not maintain an approved independent industrial, agri-
3 cultural or household arts school, offering the type of training which
4 he desires, may make application for admission to such a school
5 maintained by another city or town. The board of education, whose
6 decision shall be final, may approve or disapprove such application.
7 In making such a decision the board of education shall take into
8 consideration: the opportunities for free vocational training in the
9 community in which the applicant resides; the financial status of
10 the community; the age, sex, preparation, aptitude and previous
11 record of the applicant; and all other relevant circumstances.

12 2. The city or town in which the child resides, whose application
13 for admission to an approved independent industrial, agricultural
14 or household arts school maintained by another city or town has been
15 approved, shall pay such tuition fee as may be fixed by the board
16 of education; and the commonwealth shall reimburse such a city or
17 town, as provided for in this act. If any city or town neglects or

18 refuses to pay for such tuition, it shall be liable therefor in an action
 19 of contract to the city or town, or cities and towns, maintaining the
 20 school which the pupil, with the approval of the said board,
 21 attended.

REIMBURSEMENT.

1 SECTION 8. Independent industrial, agricultural and household
 2 arts schools shall, as long as they are approved by the board of
 3 education as to organization, control, location, equipment, courses
 4 of study, qualifications of teachers, methods of instruction, conditions
 5 of admission, employment of pupils and expenditures of money,
 6 constitute approved local or district independent vocational schools.
 7 Cities and towns maintaining such approved local or district inde-
 8 pendent vocational schools shall receive reimbursement as provided
 9 for in sections nine and ten of this act.

1 SECTION 9. 1. The commonwealth, in order to aid in the mainte-
 2 nance of approved local or district independent industrial and house-
 3 hold arts schools and of independent agricultural schools consisting
 4 of other than agricultural departments in high schools, shall, as pro-
 5 vided for in this act, pay annually from the treasury to cities and
 6 towns maintaining such schools an amount equal to one-half the sum
 7 to be known as the net maintenance sum. Such net maintenance sum
 8 shall consist of the total sum raised by local taxation and expended
 9 for the maintenance of such a school, less the amount, for the same
 10 period, of tuition claims, paid or unpaid, and receipts from the work
 11 of pupils or the sale of products.

12 2. Cities and towns maintaining approved local or district inde-
 13 pendent agricultural schools consisting only of agricultural depart-
 14 ments in high schools shall be reimbursed by the commonwealth, as
 15 provided for in this act, only to the extent of two-thirds of the
 16 salary paid to the instructors in such agricultural departments: *pro-*
 17 *vided*, that the total amount of money expended by the common-
 18 wealth in the reimbursement of such cities and towns for the salaries
 19 of such instructors for any given year shall not exceed ten thousand
 20 dollars.

21 3. Cities and towns that have paid claims for tuition in approved
 22 local or district independent vocational schools shall be reimbursed
 23 by the commonwealth, as provided for in this act, to the extent of
 24 one-half the sum expended by such cities and towns in payment of
 25 such claims.

1 SECTION 10. On or before the first Wednesday of January of each
 2 year the board of education shall present to the legislature a state-
 3 ment of the amount expended previous to the preceding first day
 4 of December by cities and towns in the maintenance of approved

5 local or district independent vocational schools, or in payment of
 6 claims for tuition in such schools, for which such cities and towns
 7 should receive reimbursement, as provided for in this act. On the
 8 basis of such a statement the legislature may make an appropriation
 9 for the reimbursement of such cities and towns up to such first day
 10 of December.

ACTS AND PARTS OF ACTS REPEALED. .

1 SECTION 11. 1. Sections one to six inclusive of chapter five hun-
 2 dred and five of the acts of nineteen hundred and six, sections one to
 3 four inclusive of chapter five hundred and seventy-two of the acts of
 4 nineteen hundred and eight, chapter five hundred and forty of the
 5 acts of nineteen hundred and nine, and all acts and parts of acts
 6 inconsistent herewith, are hereby repealed.
 7 2. Schools, heretofore established under the acts and parts of acts
 8 repealed by this section, and approved by the board of education,
 9 shall continue in operation subject to the provisions of this act for
 10 such schools.

THE COMMONWEALTH OF MASSACHUSETTS

REPORT OF THE BOARD OF EDUCATION ON AGRI- CULTURAL EDUCATION

Submitted to the Legislature of Massachusetts of 1911, in
accordance with Chapters 108 and 133, Resolves of 1910







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